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ABSTRACT

This unit, one of six which comprise the Fair Play program, teaches students to use data analysis skills to examine sex differences in career choices, mathematics attitudes, and treatment in the labor force. The Fair Play program is a series of student and teacher materials the purpose of which is to help students expand their female or male self-concepts, increase their decision-making skills, and improve their academic achievement by changing their stereotypic attitudes toward particular content areas. This teaching guide includes a brief description of the total program, an overview of the content of this unit, recommendations for instructional approaches, descriptions of program materials, a bibliography of print and audiovisual resources, and tips for small-group management. The bulk of this guide consists of the student guide which contains 18 lessons organized into three parts: (1) differential treatment and attitudes of males and females in relation to mathematics and mathematics oriented careers; (2) application of data analysis skills to male and female economic issues; and (3) consideration of personal career options and mathematics attitudes. Detailed annotations are provided to aid the teacher in planning and presenting each lesson. The final section provides a unit performance test with answer key. (DC)

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**Fair Play: Developing Self-Concept
and Decision-Making Skills
in the Middle School**

Decisions about Mathematics

Teacher's Guide

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**Women's Educational Equity Act Program
U.S. Department of Education
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Preface

Cultural beliefs and attitudes about what it means to be female or male influence all of us. Recently, beliefs about what females can and should do have been changing. Beliefs about male roles are changing too. Students need an opportunity to examine themselves in a new light—and make decisions about their lives.

This program, Fair Play: Developing Self-Concept and Decision-Making Skills in the Middle School, has two main purposes: to expand each student's female or male self-concept, and to increase each student's decision-making capabilities. Because of the recent emphasis on teaching basic skills in the schools, a third focus of the program is to improve students' academic abilities and skills. Specifically, the program goals are as follows:

- To help students expand their self-concept in relation to their female or male identity, including their role behavior, personality traits, and occupational aspirations and expectations
- To increase students' self-confidence and participation in making decisions
- To increase students' academic achievement by helping students change stereotypic attitudes toward particular content areas and alerting them to the relationship between subject matter and occupational opportunity

Program units are a series of five student texts and six teacher's guides designed to supplement components of the present curriculum. In each of these units, students have the opportunity to discover information that can enable them to expand their female or male self-concepts. Students are encouraged to examine stereotypes about what girls or boys "are like" and what girls or boys "should do." Students then have the opportunity to make personal and group decisions based on the knowledge they have gained.

The units, which focus on specific skills, are as follows:

- Decisions and You—a 12-lesson prerequisite decision-making unit in which students learn personal and group decision-making skills (student text and teacher's guide)
- Decisions about Roles—a 20-lesson social studies unit in which students find out how roles change over time and how people can choose and define their roles (student text and teacher's guide)
- Decisions about Language—a 20-lesson language arts unit in which students compare and analyze female and male language (student text and teacher's guide)
- Decisions about Mathematics—an 18-lesson math unit in which students learn how to collect and interpret quantitative data while examining economic and career-related issues about females and males (student text and teacher's guide)
- Decisions about Science—a 17-lesson science unit in which students examine female and male characteristics and behaviors in relation to genetics and environment (student text and teacher's guide)
- Decisions about Physical Activity—a 29-lesson physical education unit in which students participate in a physical fitness program designed to improve students' fitness skills and attitudes toward physical activity (teacher's guide)

The teacher's guide for each unit contains not only the student materials but also detailed annotations to aid the teacher in planning and presenting each lesson.

Introduction

The purpose of this unit, Decisions about Mathematics, is to give students the opportunity to develop data collection skills. In the unit, students use these skills to examine female and male differences in attitudes toward math, choice of careers, and treatment in the labor force.

Studies show that both girls and boys, especially as they move into adolescence, view math as a male domain. A major reason for this attitude is that parents and teachers influence girls and boys differently in relation to math achievement. For example, parents often buy more math-related games for sons than for daughters, expect higher levels of math achievement from sons than from daughters, and offer more explicit rewards to sons than to daughters who learn math. Research indicates that when authority figures give girls the message that girls are not expected to be interested in or excel in math, it is easier for girls to disregard their own interests and inclinations than to challenge the authority figure.

As a result of this differential treatment, girls take fewer math courses than boys, thereby lowering girls' chances of meeting prerequisite requirements for areas such as statistics and engineering. Because they often act according to stereotypes they've learned about females and males, girls (and boys) may make choices about their future for which they may be rewarded presently, but punished later—in the form of low pay, and jobs and lifestyles they don't enjoy.

American culture today is undergoing changes that have tremendous social and economic implications. Students need to be given the chance to rethink their options as females and males and to expand those options in a way that will increase their chances for fulfillment, both socially and economically.

In this unit, students have the chance to examine these attitudinal and economic issues through the use of data collection skills. The 18 lessons in this unit, which take between four and five weeks to complete, are grouped into three parts.

In Part I, Math and Money, students are introduced to the issues outlined above.

In Part II, Collecting and Analyzing Data, students learn data analysis skills such as averaging; determining ratios and percents; rounding; and constructing and interpreting pictographs, histograms, line graphs, and circle graphs. The students use these skills to collect and analyze information about female and male economic issues.

In Part III, Your Future, students are given the opportunity to use the information they've discovered to think about their own career options and their attitudes toward math.

TEACHING THE UNIT

To implement these lessons, you will need an appropriate number of copies of the student text, a teacher's guide (which includes pretests and posttests), and an Implementation Handbook.

The unit is designed so that teachers can use it in one of three ways. First, the lessons can be used sequentially, on a daily basis, which will require four to five weeks. Second, the lessons can be interspersed in the regular curriculum program over a longer period of time. Third, individual lessons or series of lessons can be used in conjunction with particular topics at appropriate points. The way the lessons are used should be based on the needs of students, other curricular priorities, and classroom time constraints.

Because the unit is structured according to a decision-making model, it is strongly suggested that the lessons used be sequenced to allow student involvement in all four decision phases. Otherwise, the decision-making impact of the unit will be lost. A sample sequence for a class not using the entire unit might be two lessons from Part I, five lessons from Part II, and one or two lessons from Part III. In this way, students will have completed lessons from each part. The lessons chosen should work smoothly together, be appropriate for the particular level and age of the students, and relate to the present curriculum.

As a guide to using the lessons with different levels of students, three possible approaches to the lesson are outlined under Teaching Suggestions in the Teacher Overview for each lesson. Level 1 is the minimal course; activities at this level can often be oral instead of written, and the approach should allow relatively more time for reinforcement. Level 2 is the regular course. And Level 3 is the enriched course; the approach at this level often includes additional activities on the assumption that students can more quickly master the skills in the minimal and/or regular course and proceed to expand their skills in other activities.

In general, Level 1 refers to sixth-grade students, Level 2 to seventh-grade students, and Level 3 to eighth-grade students. However, the ability and motivation of children vary greatly from region to region and from school to school. Care should be taken to choose a level that seems appropriate for your particular classroom. In many cases during field testing, for example, sixth-grade students easily worked through Level 2 activities. Activities, then, should be scheduled and presented in the way that seems best for your class.

Since the emphasis of these materials is on the affective as well as the cognitive thinking process, it is essential that you the teacher create a climate of acceptance in which the students

feel free to express a variety of viewpoints. In many instances, questions have no right or wrong answers. Eliciting from the students their honest, thoughtful answers to these questions is necessary for the unit to be a success.

You are encouraged to make a special effort to ensure that a large proportion of both female and male students participate in the activities, discussion, and decision making.

Many of the activities can be done by students individually. Sometimes the text indicates that an activity should be done with partners or in small groups. In general, activities should be done in the way that seems most appropriate for your students and classroom organization. If activities are done in small groups, you should circulate among the groups to help those who may have difficulty. (See page xvii for tips on small-group management.)

MATERIALS

Student Materials

In each lesson, students participate in a variety of activities, including reading the text and answering questions (with or without partners), and participating in class discussions, small-group activities, and role-playing.

The evaluation exercise at the end of many lessons is called a Flight Check. Flight Checks may be used as small quizzes for grading purposes, as tests if the evaluation activities for several lessons are accumulated, or as self-evaluation activities for students' information only. Lessons in the first and last parts of the unit do not have a Flight Check, since the main objective of these lessons is either exploration or personal and group decision making.

Teacher's Guide

The teacher's guide contains the student text and annotated material for your use and convenience. Each lesson is preceded by a Teacher Overview that indicates the lesson's duration, purpose, student objectives, vocabulary, and background information. Some lessons may need more time than that specified, depending on their level of difficulty, students' level of involvement, and use of optional activities. In the teacher's guide, the answers to student questions are included within each lesson.

Unit Performance Test

In order to determine students' level of readiness before beginning the unit, you will need to administer the unit pretest (Unit Performance Test). At the completion of the unit, you should readminister the test to determine how much students have progressed and in what areas they need additional assistance. The pretest/posttest, as well as the answers, is included in the back of the teacher's guide.

Implementation Handbook

The Implementation Handbook is designed to assist the school—its faculty, students, and administrators, as well as students' parents—in carrying out the basic goals of the Fair Play program.

For your convenience, the handbook is designed as a reference. Sections addressed to both teachers and administrators involved in the program include Program Goals, Description of Units, and Program Evaluation. A section entitled Administering the Program specifically addresses administrative concerns, while the section Teaching the Program contains material particularly useful for teachers.

You will probably make the most use of the handbook while you are planning implementation of the program. But keep it handy throughout, for use in clarifying particular aspects of the program.

RESOURCES

The following print resources were used in developing this unit and may be useful sources for teachers desiring further information. The audiovisual materials listed in this section may be used at appropriate points in the unit to heighten student interest and reinforce learning.

Print Materials

- Baur, Gregory, and George, Linda Olsen. Helping Children Learn Mathematics: A Competency-Based Laboratory Approach. Menlo Park, Calif.: Cummings Publishing Co., Inc., 1976.
- Ernest, John. Mathematics and Sex. Santa Barbara, Calif.: University of California, 1976.
- U.S. Commission on Civil Rights. Women and Poverty. Washington, D.C.: U.S. Commission on Civil Rights, June 1974. Staff report.
- U.S. Department of Labor. The Earnings Gap between Women and Men. Washington, D.C.: U.S. Department of Labor, Employment Standards Administration, Women's Bureau, 1976.
- U.S. Department of Labor. 1975 Handbook on Women Workers. Washington, D.C.: U.S. Department of Labor, Employment Standards Administration, Women's Bureau, 1975. Bulletin 297.
- U.S. Department of Labor. "Occupational Earnings of Men and Women." Monthly Labor Review. Washington, D.C.: U.S. Department of Labor, Women's Bureau. April 1982. Pp. 25-31.
- U.S. Department of Labor. Occupational Outlook Handbook, 1978-79 Edition. Washington, D.C.: Bureau of Labor Statistics, 1978.
- U.S. Department of Labor. Occupational Outlook Handbook, 1982-83 Edition. Washington, D.C.: Bureau of Labor Statistics, 1982. Bulletin 2200.
- U.S. Department of Labor. U.S. Working Women: A Databook. Washington, D.C.: U.S. Department of Labor, Bureau of Labor Statistics, 1977. Bulletin 1977.

Audiovisual Materials

Listings

Nonprint Resources in Women's Educational Equity. Princeton, N.J.: Educational Testing Service, 1978. 243 pages. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock number 017-080-01836-5.

Positive Images: A Guide to Nonsexist Films for Young People. Produced by Linda Artel and Susan Wingraf, 1976. 176 pages. Available from Booklegger Press, 555 29th Street, San Francisco, Calif. 94131.

Women and Work—New Options: A Guide to Nonprint Media. Produced by Linda Artel, 1979. 76 pages. Available from the Women's Educational Equity Communications Network, operated by the Far West Laboratory for Educational Research and Development, 1855 Folsom Street, San Francisco, Calif. 94103.

Films

But What Can a Girl Do—A Series. Film showing eight interviews with American working women. Available from Westinghouse Learning Corp., 100 Park Avenue, New York, N.Y. 10017.

Cinderella Is Dead! Filmstrip, with cassettes, of women in the labor market. Shows effect of the mass media on sex roles and alternatives now open to women. Sale \$17. Available from National Education Association, 1202 16th Street, NW, Washington, D.C. 20035.

I'm Going to Be . . . an Engineer. 15-minute color film (1977) designed to inform and interest both girls and boys, blacks and whites, in engineering. Rental \$17, sale \$205. Available from Universal Education, 100 Universal Plaza, Universal City, Calif. 91608.

Jobs in the City: Women at Work. Produced by Douglas MacDonald. 11-minute color film (1972) showing women in a wide variety of nontraditional and traditional jobs. Sale \$165, rental-inquire. Available from Centron Educational Films, Lawrence, Kan. 66044.

The Math-Science Connection. 18-minute color film, 16mm (1980) documenting high-interest programs that encourage females to prepare for math and science careers. Sale \$115, rental (3 days) \$8. Videotape cassette (color, 3/4"); sale \$32, rental (3 days) \$5. Available from WEEA Publishing Center, Education Development Center, 55 Chapel Street, Newton, Mass. 02160.

New Entrepreneurs. 11-minute color film showing a portrait of Denise Cobb, the founder of a company providing services to people who travel a lot in their jobs. Sale \$175, rental-inquire. Available from ACI Films, Inc., 34 West 45th Street, New York, N.Y. 10036.

New Horizons for Women. Color filmstrip, with cassette, showing new career opportunities for women, and the job discrimination women face. Sale \$28. Available from Pathescope Educational Media, Inc., 71 Weyman Avenue, New Rochelle, N.Y. 10802.

Other Women, Other Work. Produced by Joan Churchill and Janie Kennedy. 20-minute color film (1973) showing women working in stereotypically male occupations. Available from Extension Media Center, 2223 Shattuck Avenue, Berkeley, Calif. 94720.

Women in the World of Work. 15-minute color film showing six women in nontraditional jobs discussing their work. The jobs are test engineer, filmmaker, scientist, congresswoman, housing inspector, and NASA employee. Rental \$17.50, sale \$175. Available from Vocational Films, 111 Euclid Avenue, Park Ridge, Ill. 60068.

TIPS ON SMALL-GROUP MANAGEMENT

Although getting students to work in small groups can be frustrating for you and sometimes unproductive, it can also be rewarding, both socially and academically, for your students. Here are some suggestions to help you and the students have successful experiences with small-group work.

Advance Preparation

Make sure you know exactly what you want students to accomplish in their groups, and make sure you have enough materials for each group.

Organizing Students into Groups

In general, assign students to groups instead of allowing them to choose their own. This way, you will avoid the prospect of cliques working together all of the time, some students being left out, or all of the high achievers or low achievers being in one group. You can assign students in one of two ways:

- (a) randomly group them, having them count off or having them choose cards marked with numbers or symbols for each group; or
- (b) arrange the groups so that they are balanced for race, sex, skill level, and compatibility.

When you randomly group students or balance the groups, explain to the students why they are doing small-group work: You want them to learn how to work with one another, respect one another, and learn from one another; you want them to get to know everyone else in the class; and you want them to work seriously on the problem at hand. Emphasize that working in groups is an extremely important life skill. Be sure to let students know that you do not expect them to be perfect at group work in the beginning. It takes practice and certain skills. It's serious business!

Make sure the students know exactly where each group is to work. Put three to five students in each group. The groups should be small enough so that everyone can easily participate.

Guidelines for What Happens in the Group

Be firm and explicit about what you expect from the students. Establish rules for group work and make sure everyone understands the rules. Have the students help you in establishing these limits for effective group work. Emphasize that everyone is expected to contribute to the group and to listen respectfully to every other group member's ideas.

Be sure to tell students specifically what you expect them to produce from their work in the group.

You can assign a group leader, tell the group to choose one, or simply allow a leader to emerge within each group. You may choose each of these strategies at different times. It is often helpful to have a group recorder.

Set a time limit for the work. If you expect the students to accomplish several things, break up the task into small tasks and time segments. You might say: "I want each group to list at least three reasons why so few women work as physicists. You have five minutes to complete this assignment. When you have agreed on three reasons, I will give you the second part of your assignment. Okay, your five minutes begin now." Then circulate among the groups. Help groups if they need it and be ready to hand them (or verbally explain) the next part of their assignment when they are ready. As much as possible, keep to your time limits. Sometimes you will need to extend the limit if you have underestimated the difficulty of the assignment or students' degree of interest in it. When you allow more time, set another specific limit.

Circulate among the groups, and interact with them. If a group is having problems, try to help by providing hints, asking questions, or giving feedback about how the group members are working together.

Provide students with instruction in ways to cooperate, come to agreement, generate ideas, solve conflicts, assume responsibility, and respond to one another. Discuss and have students practice the following productive group behaviors: (a) giving ideas and information; (b) encouraging other group members to share by asking them for information, ideas, opinions, or feelings; (c) actively listening; (d) clarifying and making connections; and (e) checking to see if the group agrees on an idea.

Collect the results, or have the students share with the class the results of their group work. Be sure to have a procedure for students to follow in cleaning up and in returning any materials used.

Evaluation

To emphasize the importance of group work, you can assign grades based on students' efforts to work together and the excellence of their product. Group cooperation and responsibility to the group can be rewarded by assigning to all students in the group the same grade. Provide frequent opportunities for groups to evaluate how their members have worked together. In addition, provide students with feedback about how you think group members have worked together.

To you, the student:

What is your attitude toward mathematics?

Do you think math is only for geniuses? Do you enjoy using math, or are you afraid of math? Do you think math is mostly for boys? Does math fit into your future career plans?

If you have a negative attitude toward math, you are limiting your choices. For example, many girls think math is for boys, so they don't work to be successful in math. As a result, later in life, these girls are often limited to a small number of job choices.

In this unit, you will have an opportunity to rediscover math. You will use math to collect information about yourself, your friends, and your family. You will find out the importance of math in preparing both girls and boys for many different careers.

In the final part of the unit, you will have a chance to use math to make decisions about your life.

Math and Money

Part I

TEACHER OVERVIEW FOR LESSON 1

Duration: One class period

Purpose: To help students explore their attitudes about math

Student Objectives:

- To compile a questionnaire concerning attitudes about math and then analyze the results in terms of female and male responses
- To hypothesize about factors that influence the attitudes of girls and boys toward math

Teaching Suggestions:

All levels: All activities

Vocabulary: No new words

Evaluation Activity: None

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

- Students' attitudes toward math affect their performance in math.
- More boys than girls take math courses in high school.
- Many people feel that math is a subject for males. This attitude affects the enrollment of females in math courses and limits their access to careers.
- The way girls and boys are raised affects their attitude toward, and ability in, math.

Lesson 1: Girls and Boys in Math

Activity A: Do you like math?

Do you enjoy math? How about your classmates—which of them enjoy math? How many of them are going to take math throughout high school?



Lesson 1

Suggestions for Activity A: At the beginning of the activity, ask the students to complete the questionnaire individually. Then tabulate the information for all students on the chalk board.

One method of obtaining the data for tabulation is to read the question aloud and request a show of hands for all boys who answered yes to the question. Then proceed to the other columns and complete the data for all the questions in this manner.

To find out the answer to these questions, first answer each question below. Answer with yes, no, or undecided. Then, your teacher will tally girls' and boys' responses.

- A-1 Do you like math?
- A-2 Do you get good grades in math?
- A-3 Do you plan to take at least three math courses in high school?
- A-4 Do you think boys are better than girls at math?
- A-5 Would you seriously consider preparing for a career in math?

Look at the tally of answers in your class. Then answer the following questions.

- A-6 Do more males or females enjoy math?
- A-7 Do more males or females get good grades in math?
- A-8 Do more males or more females plan to take at least three math courses in high school?
- A-9 Do more males or more females think that boys are better than girls at math?
- A-10 Do more males or more females plan to prepare for careers in math?

Activity B (discussion): Female and male attitudes toward math

- B-1 Discuss possible reasons for your answers to A-6 through A-10.
- B-2 Research shows that, as girls grow older, they tend to stop taking math. What do you think is the reason that girls change?
- Because they are not good at math?
 - Because they think they won't need math—since they plan to get married and not work?
 - Because they are told math is a male subject?
- B-3 What are some differences in the way boys and girls are raised? What are some differences in the courses they take? Can these differences explain why boys take math courses more often? If so, how?



B-1 Answers for A-6 and A-7: More boys than girls may enjoy math, even though girls often get better grades in math than boys do in middle school. Many people perceive math as a male area. Our society has stereotyped males as more logical (and therefore more mathematical) than females. Studies show that males are not better in math—they are just better trained. For example, boy scouts receive training in map reading and making rope bridges, whereas girl scouts often are not trained in these skills. Also, in some studies, scores on spatial-relation tests were positively correlated with the number of years of training in mechanical drawing—another traditionally male area.

Answers for A-8: Studies show that a much smaller proportion of girls than boys take four years of high school math. Girls then often find it harder to major in math-related areas in college.

Answers for A-9: Studies show that both females and males perceive math to be a male domain. These attitudes arise from cultural stereotypes about "appropriate" female and male activities and careers. Now that more and more women are moving into the labor force, many of these stereotypes are being questioned by both females and males and are being proven wrong.

Answers for A-10: Even though many girls make good grades in math, they do not choose math-related careers. In high school, girls often feel peer and parental pressure to take other courses and prepare for traditionally female careers.

B-2 Many girls believe math is a subject for males, and in their adolescence and young adulthood they feel pressure to conform to societal stereotypes about inappropriate female activity. As a result, they either choose not to prepare for a career at all, or at least avoid careers that require a math background. Girls need to think about the realities of female adulthood. One of these realities is that nine out of ten women will work at least 25 years of their lives.

B-3 Boys have many more chances than girls to develop visual-spatial skills, since boys are given mechanical toys (instead of dolls) to play with, are encouraged to explore the outdoors, and are encouraged to take courses like mechanical drawing. Girls, on the other hand, are often encouraged to be polite, to engage in more passive activities, and to take courses like home economics.

Activity C:
Reasons for feelings

Form a group with three or four other students. Choose a group recorder to write your group's answers. Discuss the following questions. Then present your group's answers to the class.

C-1 through C-3 See B-2 and B-3.

C-4 Sample answers: because they are good at it, because they are encouraged to like math, because their family members and friends enjoy math, because they have been encouraged to do activities requiring visual-spatial skills and other math skills.

C-5 Sample answers: because they are encouraged to be afraid of math, because their family members and friends are afraid of math, because they have not been encouraged to do activities requiring visual-spatial skills and other math skills

C-6 Teachers, friends, parents

C-1 In what ways are boys and girls raised differently? What activities are boys encouraged to do? What activities are girls encouraged to do?

C-2 What courses are girls encouraged to take? Are boys encouraged to take the same courses?

C-3 Look at your answers for C-1 and C-2. Can these differences determine whether someone is good at math or likes math? Explain.

C-4 What are some reasons people may enjoy math?

C-5 What are some reasons people may be afraid of math?

C-6 What people influence your attitude toward math?

TEACHER OVERVIEW FOR LESSON 2

Duration: One class period

Purpose: To help students become aware of economic issues relating to differential treatment of females and males

Student Objectives:

- To state personal opinions about issues that concern traditional and nontraditional female and male roles
- To hypothesize about why inequalities exist between working women and working men
- To hypothesize about the relationship of mathematics to careers and salaries

Teaching Suggestions:

All levels: All activities

Vocabulary: No new words

Evaluation Activity: None

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

- Society has certain opinions about appropriate roles for women and men. These opinions affect the actions of individuals.
- Men generally earn more money than women do because of factors such as amount and type of education, work experience, job selection, and sex discrimination.
- An increasing number of women work outside the home.
- An increasing number of jobs require math backgrounds.

Lesson 2: **Females and Males Making Money**

Activity A: **Females and males in society**

In the last lesson, you discovered differences in female and male attitudes toward math. You tried to think of reasons for these attitudes.

You probably discovered that girls and boys are often treated differently while growing up. Boys are often encouraged to play with mechanical toys, to explore the outdoors, and to take courses such as shop and mechanical drawing. Girls, on the other hand, often play with dolls and are taught things like cooking.

What about adults? Are there differences in what female and male adults like and do? Are there differences in the way female and male adults are treated by society?

In this lesson, you will think about these questions. In the following lessons, you will use mathematics to gather information about these questions.

Lesson 2

Form a group with four or five other students. Read the questions below and discuss each one carefully. Have your group recorder write your group's answers.

A-1 Traditional jobs for women include teaching, nursing, clerical or secretarial work, waitressing, house-keeping (paid and unpaid), and other service jobs.

Traditional jobs for men include all jobs except traditionally female jobs.

A-2 More than 20 years; the number is increasing due to divorce and the high cost of living. Nine out of ten women work 25 years full time. Students should be aware that many women who don't plan to work end up in financial difficulty or become trapped in low-paying jobs.

A-1 In the past, our society had strict opinions about what jobs women should hold and what jobs men should hold. Give examples of these jobs.

A-2 How many years do you think adult women work outside the home—less than 10 years, 10 to 20 years, or more than 20 years?



- A-3 In general, women are paid less than men. Why do you think this situation exists? (Think about these factors: amount of education, amount of math and science background, areas of study in college, sex discrimination.)
- A-4 Why do many women choose not to prepare for a career? How might their choice be a mistake?
- A-5 Do you think more jobs or fewer jobs in the future will require math backgrounds? Explain.
- A-6 Think of jobs that require math skills. List the jobs. Are they generally high-paying or low-paying? Are they held mostly by men or by women?
- A-3 Sample answers: sex discrimination, lack of education that would prepare women for high-paying careers, lack of sufficient math and science preparation to pursue careers that require such a background.
- A-4 Many girls either don't plan for the future, or plan to get married and assume they won't have to work.
- A-5 More jobs primarily because of the growth of technology.
- A-6 Sample answers: most jobs in business (including accounting, finance, management, computer science); veterinary science; medicine; pharmacy; engineering; scientific research; statistics.
- Most of these jobs are high-paying and are available to women as well as men, although they are currently held mainly by men.

Activity B:

Class wrap-up

Discuss your answers for Activity A.

Collecting and Analyzing Data

Part II

TEACHER OVERVIEW FOR LESSON 3

Duration: One or more class periods

Purpose: To introduce students to the construction and use of frequency tables

Student Objectives:

- To construct a frequency table and find the totals for the the rows and columns in the table
- To generalize about the amount of housework performed by working women and men

Teaching Suggestions:

Level 1: Activity A, orally; all other activities

Levels 2 and 3: All activities

Vocabulary: Frequency table

Evaluation Activity: None

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

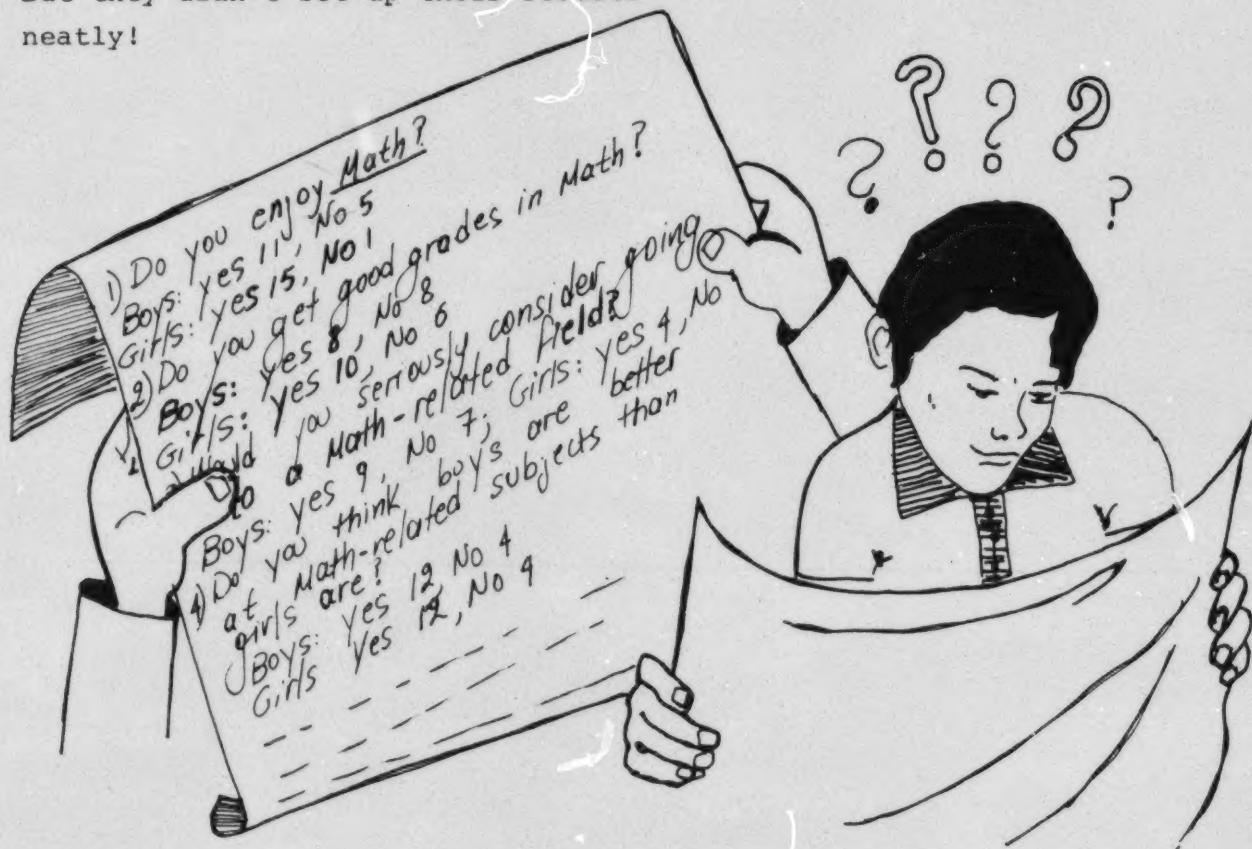
- Constructing a frequency table is a way of organizing data to show how often something occurs.
- Many women who work outside the home still face the the responsibilities of housework.

Lesson 3: Frequency Tables

Activity A: What is a frequency table?

A sixth-grade math class at Martin Luther King, Jr. School completed an interview form about female and male attitudes toward math.

But they didn't set up their results neatly!



Lesson 3

Their teacher said, "Organizing data into a table helps!" So that's what they did. They made a frequency table to show their results. The table is shown below.

A frequency table tells how many times something occurs. For example, the frequency table below tells how many times boys and girls said yes when asked whether they liked math.

Interview Questions	Boys		Girls	
	Yes	No	Yes	No
1. Do you enjoy math?	11	5	15	1
2. Do you make good grades in math?	8	8	10	6
3. Would you seriously think about preparing for a career in math?	9	7	4	12
4. Do you think that boys are better at math than girls are?	12	4	12	4
5. Do you plan to take at least three math courses in high school?	13	3	10	6

As you can see, a frequency table helps to organize results. Use the frequency table to answer the following questions.

A-1 9

A-2 5; 1

A-3 10

A-1 How many boys would consider going into a math-related career?

A-2 How many boys do not enjoy math? How many girls?

A-3 How many girls plan to take at least three math courses in high school?

A-4 According to this table, do more boys or more girls get good grades in math?

A-4 Girls

A-5 According to this table, would more boys or more girls prepare for a math-related career?

A-5 Boys

This frequency table shows the results of a test that had 10 questions:

Number Correct	Percent Score	Tally	Number of Students
10	100%		3
9	_____	+++	6
8	80%	+++ +++	10
7	70%	_____	11
_____	60%	+++	9

A-6 Complete the table by filling in the three blanks. (Use the rest of the data in the table to find your answers.)

A-6 6; 90%; ~~||||~~ |||

A-7 How many students got 60% correct?

A-7 9

A-8 How many students got 7 correct?

A-8 11

A-9 What percent score is 8 correct?

A-9 80%

A-10 How many students are there in the class?

A-10 39

A-11 How many students got 90% correct?

A-11 6

Lesson 3

Activity B: Thinking about time

See chart at end of chapter for answers.

Use the following information to complete a table like the one below. The information explains the time people working at home spend doing housework.

As you make your table, remember that people who work at home have a 7-day work week. People who work outside the home have a 5-day work week.

Food Preparation		Family Care	
Sunday:	3 hours	Sunday:	3 hours
Monday:	2 hours	Monday:	2 hours
Tuesday:	3 hours	Tuesday:	4 hours
Wednesday:	2 hours	Wednesday:	4 hours
Thursday:	2 hours	Thursday:	2 hours
Friday:	2 hours	Friday:	2 hours
Saturday:	4 hours	Saturday:	3 hours

House Care	Shopping and Running Errands	Clothing Care
Sunday: 1 hour	Sunday: 0 hours	Sunday: 1 hour
Monday: 1 hour	Monday: 0 hours	Monday: 0 hours
Tuesday: 1 hour	Tuesday: 0 hours	Tuesday: 1 hour
Wednesday: 2 hours	Wednesday: 3 hours	Wednesday: 2 hours
Thursday: 2 hours	Thursday: 1 hour	Thursday: 1 hour
Friday: 1 hour	Friday: 0 hours	Friday: 2 hours
Saturday: 3 hours	Saturday: 3 hours	Saturday: 1 hour

Source. U.S. Department of Labor, Bureau of Labor Statistics, 1975.

Housework Time (in hours) for People Working at Home								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Food Preparation								
House Care								
Family Care								
Shopping and Running Errands								
Clothing Care								
Total								

Adapted from 1975 *Handbook on Women Workers*, U. S. Department of Labor, Women's Bureau, p. 173.

Activity C: **A working couple**

Choose a partner for this activity.

Many studies show that women who work full-time still do most of the housework.



Lesson 3

See chart at end of chapter for answers.

One family's times are recorded below. Make two frequency tables like the one shown in Activity B. Use the information below.

Frequency Table 1: Housework Time for the Working Woman	Frequency Table 2: Housework Time for the Working Man
Food Preparation Sunday: 2 hours Monday: 2 hours Tuesday: 2 hours Wednesday: 2 hours Thursday: 2 hours Friday: ½ hour Saturday: 2 hours House Care Sunday: ½ hour Monday: 1 hour Tuesday: 1 hour Wednesday: 2 hours Thursday: 1 hour Friday: 1 hour Saturday: 3 hours Family Care Sunday: 1 hour Monday: 1 hour Tuesday: 1 hour Wednesday: 1 hour Thursday: 1 hour Friday: 1 hour Saturday: 1 hour Shopping and Running Errands Sunday: ½ hour Monday: ½ hour Tuesday: 2 hours Wednesday: 0 hours Thursday: 2 hours Friday: 1 hour Saturday: 0 hours Clothing Care Sunday: 0 hours Monday: 1 hour Tuesday: 1 hour Wednesday: 1 hour Thursday: 1 hour Friday: 2 hours Saturday: 1 hour	Food Preparation Sunday: ¼ hour Monday: 0 hours Tuesday: 0 hours Wednesday: 0 hours Thursday: 0 hours Friday: 0 hours Saturday: 0 hours House Care Sunday: 0 hours Monday: ½ hour Tuesday: ½ hour Wednesday: 0 hours Thursday: 0 hours Friday: 0 hours Saturday: 1 hour Family Care Sunday: 1 hour Monday: ½ hour Tuesday: 1 hour Wednesday: 0 hours Thursday: 0 hours Friday: ½ hour Saturday: 1 hour Shopping and Running Errands Sunday: ½ hour Monday: 0 hours Tuesday: 2 hours Wednesday: 0 hours Thursday: 1 hour Friday: 0 hours Saturday: 2 hours Clothing Care Sunday: 0 hours Monday: 0 hours Tuesday: 0 hours Wednesday: 0 hours Thursday: 0 hours Friday: 0 hours Saturday: 1 hour

Adapted from 1975 *Handbook on Women Workers*, U. S. Department of Labor, Women's Bureau, p. 173.

Activity D: Comparing work done by women and men

Now compare the three tables you completed in Activities B and C.

- | | | | |
|-----|---|-----|---|
| D-1 | How much time do women who stay at home spend on housework each week? | D-1 | 64 hours |
| D-2 | How much time do working women spend on housework each week? How much time do working men spend on housework each week? | D-2 | 42 hours; 13 hours |
| D-3 | How many more hours do women at home spend doing housework than women at work? | D-3 | 22 hours |
| D-4 | How much time do working women have for themselves each week? That is, for how many hours can they do something besides working, doing housework, or sleeping? (Figure an average of 8 hours of sleep each night and 40 hours of work each week.) | D-4 | 30 hours |
| D-5 | How much time do working men have for themselves each week? | D-5 | 59 hours |
| D-6 | More women are working outside the home than ever before. In your opinion, why do women who work outside the home still do most of the housework? | D-6 | It is hard for people to change their self-concept and expectations of others. In our culture, housework and family care are traditionally female activities. Now that more women are working outside the home and having fewer children, our culture's attitudes are slowly undergoing change. |
| D-7 | What are some changes you would make so that housework could be shared? | D-7 | Males should have the opportunity to take courses in cooking, family care, and house care in high school. This way, they would be less intimidated by these traditionally female tasks. |

Activity E: Class wrap-up

Discuss your answers for Activity D.

Activity B

Housework Time (in hours) for People Working at Home								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Food Preparation	3	2	3	2	2	2	4	18
House Care	1	1	1	2	2	1	3	11
Family Care	3	2	4	4	2	2	3	20
Shopping and Running Errands	0	0	0	3	1	0	3	7
Clothing Care	1	0	1	2	1	2	1	8
Total	8	5	9	13	8	7	14	64

Activity C

Frequency Table 1

Housework Time (in hours) for Working Women								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Food Preparation	2	2	2	2	2	$\frac{1}{2}$	2	12 $\frac{1}{2}$
House Care	$\frac{1}{2}$	1	1	2	1	1	3	9 $\frac{1}{2}$
Family Care	1	1	1	1	1	1	1	7
Shopping and Running Errands	$\frac{1}{2}$	$\frac{1}{2}$	2	0	2	1	0	6
Clothing Care	0	1	1	1	1	2	1	7
Total	4	5 $\frac{1}{2}$	7	6	7	5 $\frac{1}{2}$	7	42

Frequency Table 2

Housework Time (in hours) for Working Men								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Food Preparation	$\frac{1}{2}$	0	0	0	0	0	0	$\frac{1}{2}$
House Care	0	$\frac{1}{2}$	$\frac{1}{2}$	0	0	0	1	2
Family Care	1	$\frac{1}{2}$	1	0	0	$\frac{1}{2}$	1	4
Shopping and Running Errands	$\frac{1}{2}$	0	2	0	1	0	2	5 $\frac{1}{2}$
Clothing Care	0	0	0	0	0	0	1	1
Total	2	1	3 $\frac{1}{2}$	0	1	$\frac{1}{2}$	5	13

TEACHER OVERVIEW FOR LESSON 4

Duration: One or more class periods

Purpose: To provide students with more practice in constructing frequency tables and to help students recognize the practical value of math

Student Objectives:

- To construct and fill in a frequency table with time spent on personal activities
- To state the actual and desirable distribution of time spent on personal activities

Teaching Suggestions:

All levels: All activities

Vocabulary: No new words

Evaluation Activity: None

Background:

The following is the main point of the lesson. Make sure to emphasize it as often as appropriate.

- Mathematics has many practical, everyday uses.

Lesson 4:

More Practice with Frequency Tables

Activity A:

How do you spend your time?

Sometimes you can use math to make decisions about your life.



Lesson 4

The frequency table below contains a list of activities. Make a table similar to this one. Record the amount of time you spend each day on each activity. Write in other activities you do and how much time you spend doing them.

Try to be as exact as possible about the amount of time you spend on each activity.

As you make your frequency table, remember that each day has a total of 24 hours. Be careful to add hours and minutes correctly.

Activity	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Eating meals								
Being at school								
Watching television								
Sleeping								
Exercising (sports)								
Doing homework								
Other								
Other								
Total	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	168 hours

Activity B:

Are you satisfied with the way you spend your time?

Take another look at the totals on the frequency table you just made.

- B-1 Are you satisfied with the time you spend on each activity? Why or why not?
- B-2 What changes can you make to improve how much you get done and how well you do some activities? (You may need to spend more time on some activities to do them well.)
- B-3 Make another frequency table. Think of a plan that will help you make better use of your time. Fill in your frequency table showing your new plan.

Activity C:

Class wrap-up

- C-1 What changes did you decide to make in the way you spend your time?
- C-2 Why did you decide to make these changes?

TEACHER OVERVIEW FOR LESSON 5

Duration: One or more class periods

Purpose: To help students understand and apply the concepts of mean, mode, and median

Student Objectives:

- To determine the mean, mode, and median of given sets of data
- To hypothesize about the reasons for differences in the earnings of females and males

Teaching Suggestions:

Level 1: Activity A, orally; all other activities

Levels 2 and 3: All activities

Vocabulary: Mean, mean average, mode, median

Evaluation Activity: Activity D (for general information about the use of evaluation activities, see page xii)

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

- The mean, mode, and median are measures of central tendency and are used to calculate statistics about many human activities.
- In general, the earnings gap between women and men is wide and continues to widen. In 1973, the median annual income for all women working full time was 57 percent of that for men; in 1970, 59 percent; and in 1956, 67 percent.
- Women and men are often paid different salaries for the same job.
- The reasons for the differences in earnings between women and men are complex, and include factors such as amount and kind of education, experience, and sex discrimination.

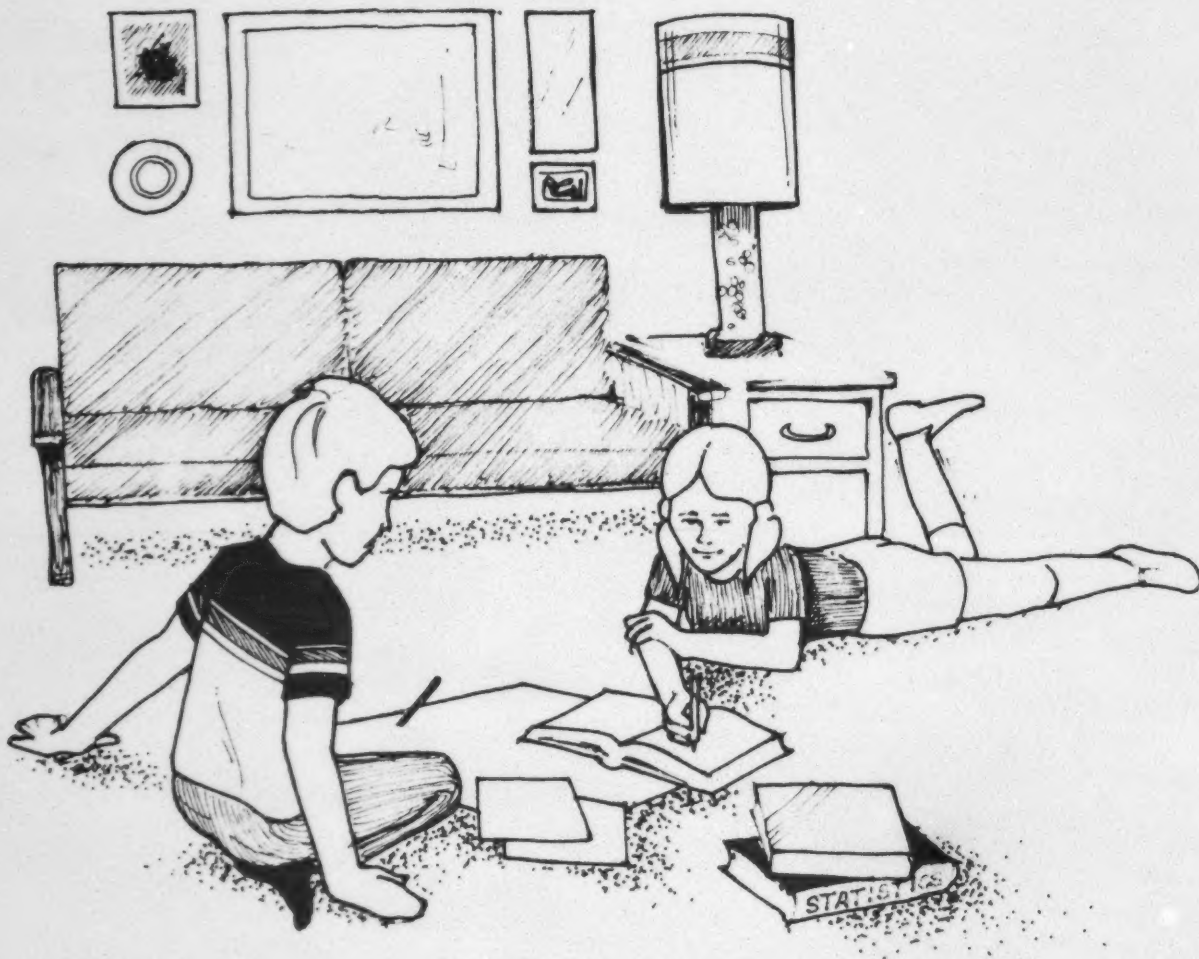
Lesson 5:

The Mean, Mode, and Median

Activity A:

Finding the mean, mode, and median

How would you like to do some work in statistics? It's easier than you think.



Lesson 5

Before you can work with statistics, you have to know the definition of some words:

The mean is one kind of average.

Example: Find the mean of these numbers:

6, 7, 9, 8, 5

Answer: $6+7+9+8+5 = 35$
35 divided by 5 numbers = 7
The mean (or mean average) is 7.

The mode is the number that occurs most often.

Example: Find the mode of these numbers:

8, 9, 8, 7, 8, 9, 9, 7, 8, 7

Answer: Arrange the numbers (data) in a frequency table like the one below. In the data column, write each number. Each time the number appears, put a mark in the tally column. Then give the total marks for each number.

Data	Tally	Total
8	////	4
9	///	3
7	///	3

You can see that 8 appears more times on the list than the other numbers do. The mode is 8.

The median is the middle number when the numbers are arranged from highest to lowest or from lowest to highest.

Example: Find the median of these numbers:

14, 14, 12, 11, 9, 8, 7

Answer: Arrange the numbers in order from highest to lowest (14 to 7). You can see that the middle number is 11. There are three numbers on each side of 11. The median is 11.

Now use the information you just read to work the following problems.

A-1 Look at this set of data:

14	10	8	7	4
14	10	8	7	
12	9	8	6	

A-1 a. 9

b. 8

c. 8

- What is the mean?
- What is the mode?
- What is the median?

A-2 Look at this set of data:

13	7	6
13	7	6
12	7	4
8	6	2
7	6	1

A-2 a. 7

b. 7 and 6

c. 7

- What is the mean?
- What is the mode? (A set of numbers may have more than one mode.)
- What is the median?

Lesson 5

A-3 a. Mean: 3
Mode: 1, 2, and 3
Median: 3

b. Mean: 18
Mode: None
Median: 18

c. Mean: 6
Mode: 6
Median: 6

d. Mean: 90
Mode: None
Median: 88.5

A-3 Find the mean, mode, and median of these sets of data. When there are two middle numbers, the median will be the average of these two numbers. That is, it will be halfway between these two numbers.

a. 1, 1, 2, 2, 3, 3, 4, 5, 6

b. 16, 17, 18, 19, 20

c. 6, 6, 6, 6, 6, 6

d. 85, 87, 88, 89, 95, 96

Activity B:

Using the mean, mode, and median to study real-life problems

Work the following problems.

B-1 Here is a list of incomes for women and men.

Men's Incomes	Women's Incomes
\$ 6,500	\$ 4,700
7,800	5,900
10,400	5,900
11,500	6,500
11,500	7,900
13,400	9,400
20,100	12,200

B-1 a. Mean: \$11,600
Mode: \$11,500
Median: \$11,500

b. Mean: \$ 7,500
Mode: \$ 5,900
Median: \$ 6,500

a. Find the mean, mode, and median of the list of men's incomes.

b. Find the mean, mode, and median of the list of women's incomes.

- c. Was the median income higher for women or for men?
- d. Do you think the median income in an occupation is usually higher for men or for women?

B-2 Look at the table below. These are actual statistics obtained from 1973 to 1977.

Median Income for Full-Time Workers				
Year	Women		Men	
	White	Minority	White	Minority
1977	\$8,870	\$7,945	\$15,378	\$10,768
1976	8,285	7,825	14,071	10,496
1975	7,514	6,834	12,884	9,561
1974	7,025	6,611	12,343	9,082
1973	6,544	5,772	11,633	8,363

Source: U.S. Department of Labor, Women's Bureau, and Bureau of Labor Statistics; and National Commission on Working Women, Center for Women and Work, Washington, D.C.

- a. What is the median income for white men in 1975?
- b. What is the median income for minority men in 1974?
- c. What is the median income for white women in 1977?
- d. What is the median income for minority women in 1976?
- e. What group has the highest median income in all five years?
- f. What group has the lowest median income in all five years?
- g. Why do you think the incomes for all of the groups are higher in 1976 than in 1975?
- h. Why might women's incomes be lower than men's? Give at least three possible reasons.

c. Men

d. Men



B-2 a. \$12,884

b. \$ 9,082

c. \$ 8,870

d. \$ 7,825

e. White men

f. Minority women

g. Wages rose because of inflation.

h. Sample answers: sex discrimination (race discrimination also, for minority women), amount of education, kind of education

Lesson 5

- B-3 a. \$ 7,562
b. \$12,136

B-3 Look at the table below. These are actual statistics for 1975.

Median Incomes for Women and Men in 1975		
Occupation	Median Income	
	Women	Men
Professional	\$10,524	\$15,968
Managers	9,125	15,903
Operatives	6,241	10,953
Clerical Workers	7,562	12,136
Service Workers	5,414	9,491

Source: *U.S. Working Women: A Databook*. U.S. Department of Labor, Bureau of Labor Statistics, 1977, pp. 5 and 65.

- a. What is the median income for women?
- b. What is the median income for men?

Activity C: Class wrap-up

- C-2 Sample answers: discrimination (past and present) in terms of educational opportunities to prepare for careers, discrimination in terms of job opportunities, choice of different jobs, lack of career planning

All of these reasons are unfair.

- C-3 Sample answers: Sex discrimination (past and present) in terms of salary, educational opportunity and job opportunity, lack of career preparation; lack of background in math and/or science, thereby limiting access to many high-paying careers; preparation in traditionally female (and lower paid) areas such as nursing, education, and clerical and secretarial work.

While part of the problem has been due to sex discrimination, women have contributed to the problem through poor career planning. Again, the question is complex, because often females are encouraged by parents, teachers, or counselors to prepare for traditionally female careers. Minority women have race discrimination as well as sex discrimination against them.

- C-1 Discuss your answers for Activities A and B.

- C-2 What are some of the reasons that minority groups make less money than whites? Which reasons are fair? Why? Which reasons are unfair? Why?

- C-3 What are some of the reasons that women in general make less money than men? Which reasons are fair? Why? Which reasons are unfair? Why?

**Activity D:
Flight check**

Did you understand this lesson? To find out, answer the following questions without looking back at the lesson. Then, your teacher will help you check your answers.

D-1 84, 86, 88, 88, 89, 90, 91

- a. What is the mean?
- b. What is the mode?
- c. What is the median?

D-1 a. 88

b. 88

c. 88

D-2 a. 7.2

b. 7 and 8

c. 7

D-2 8, 7, 6, 7, 8

- a. What is the mean?
- b. What is the mode?
- c. What is the median?

D-3 a. 1978

b. 1978

c. 1978

D-3 1978, 1978, 1978

- a. What is the mean?
- b. What is the mode?
- c. What is the median?

Lesson 5

D-4 a. 13

b. 9 and 17

c. 13

D-5 a. \$8,870

b. \$15,378

D-4 8, 9, 9, 9, 9, 13, 17, 17, 17, 17, 18

a. What is the mean?

b. What is the mode?

c. What is the median?

D-5 Look at the table below.

Median Income for Full-Time Workers				
Year	Women		Men	
	White	Minority	White	Minority
1977	\$8,870	\$7,945	\$15,378	\$10,768
1976	8,285	7,825	14,071	10,496
1975	7,514	6,834	12,884	9,561

Source: U.S. Department of Labor, Women's Bureau, and Bureau of Labor Statistics; and National Commission on Working Women, Center for Women and Work, Washington, D.C.

a. What is the median income for white women in 1977?

b. What is the highest median income in all three years?

TEACHER OVERVIEW FOR LESSON 6

Duration: One or more class periods

Purpose: To give students an opportunity to use data to make generalizations about girls' and boys' attitudes toward taking math courses

Student Objective:

- To compute the mean averages for given sets of information and to use the data to generalize about females and males in math courses

Teaching Suggestions:

Level 1: Activity A, orally; Activities B and C

Levels 2 and 3: Activities B and C

(Students may need to review decimals and fractions before working the problems.)

Vocabulary: No new words

Evaluation Activity: None

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

- To review: The mean average is computed by adding items and dividing the sum by the number of items.
- Many people regard math as a male area of study.
- When girls reach high school, their attitudes toward math often change, which affects the number of math courses they take and limits their options in terms of college programs of study.

Lesson 6: **More about the Mean**

Activity A: **Finding the mean**

Do you know that the number of math courses you take in high school can be important later in your life?

People who take very few math courses often make less money than people who take several math courses. Also, they often have more trouble finding jobs.

What is the average number of boys and girls who take math courses in middle school, high school, and college? In this lesson, you will use math to find out some interesting information about this question.

$$\begin{array}{l} 4 \times 20 = ? \\ 2 \times 30 = ? \\ 3 + 5 + 2 = ? \\ \frac{1}{3} \times \frac{2}{3} = ? \end{array}$$



Lesson 6

To obtain this information, you must know how to find the mean average. To review, read the following problem:

Meghan had five test scores, as follows:

87, 89, 97, 100, 92

To figure the mean average of her test scores, she first added the scores:

$$\begin{array}{r} 87 \\ 89 \\ 97 \\ 100 \\ + 92 \\ \hline 465 \end{array}$$

Then she divided the sum by the number of scores:

$$\begin{array}{r} 93 \\ 5 \overline{) 465} \end{array}$$

Her average was 93. This is the mean average.

Now find the mean average of the problems below.

A-1 33 pounds

A-2 9"

A-3 \$12

A-4 11 seconds

A-5 75

A-6 7

A-1 4 pounds, 62 pounds

A-2 7", 8", 12"

A-3 \$10, \$12, \$17, \$9

A-4 10 seconds, 12 seconds, 9 seconds,
13 seconds

A-5 70, 74, 66, 75, 62, 82, 96

A-6 7, 7, 7, 7

A-7 1979, 1979, 1979

A-8 1, 2, 3, 4, 5

A-9 33, 34, 35, 36, 37

A-10 9.4, 10.2, 11.3, 8.9, 7.5

A-7 1979

A-8 3

A-9 36

A-10 9.46

Activity B: Some word problems

Choose a partner and do this activity together.

Read the following problems and figure the mean averages. As you read, notice the differences in the boys' attitudes and the girls' attitudes.

B-1 Carol, Susan, Kate, and Jane are in middle school. They all enjoy math. Carol plans to take 2 math courses in high school, Susan plans to take 3, Jane plans to take 4, and Kate plans to take 3.

B-1 3

What is the average number of math courses they plan to take?



Lesson 6

B-2 2

B-2 Now, look at the girls when they are about to graduate from high school:

Carol's parents encouraged her to take math. As a result, she took 2 math courses in high school.

Susan wanted to take several math courses. But her boyfriend told her that math was for boys. She took only one math course.



In tenth grade, Kate decided that she didn't need math, since she was planning to get married right after she graduated. Kate took only one math course in high school.

Jane liked people and wanted to be a manager. She found out how important math was in getting a management job. As a result, Jane took 4 math courses in high school.

What is the average number of courses the girls took?

B-3 Hal, Dennis, and Lloyd are trying to figure out how many math courses to take in high school. All three boys plan to take 4 courses each.

B3 4

What is the average number of courses the boys plan to take?



B-4 Now, look at the boys when they are about to graduate from high school:

B4 4

Hal didn't like math, but he knew it would help him get a better-paying job. He took 4 math courses.

Dennis had always liked math. He took 4 math courses.

Lloyd planned to go into business. As a result, he took 4 math courses.

What is the average number of math courses the boys took?

Lesson 6

Now answer the following questions.

B-5 The boys weren't necessarily better or happier in math than the girls were. But were more future and career oriented—more practical in choosing their courses. Girls were often influenced by others to stop taking math courses and head in other career directions or think of marriage as an alternative. Both girls and boys are influenced by their peers, parents, and others to pursue traditional activities. In our society, boys assume that they will have to support a family; girls often assume that they will be supported by their husband.

B-6 and B-7 Girls and boys (both) should prepare for a career. If they do, they will have more options and will be less likely to become trapped in undesirable home or job situations.

B-8 a. Boys; girls.

b. The girls assumed that they would not be working or would not need math to prepare for their career. Both of these assumptions are dangerous, since presently the majority of women work outside the home for extended periods of time, and since math is required for a variety of business, medical, science, and technological careers. (These are the careers that will increasingly be available.)

B-5 What were some differences in the attitudes of the boys and of the girls?

B-6 Which attitudes make sense to you? Why?

B-7 Which attitudes do you think the students might be sorry for later? Why?

B-8 Compare the boys' and girls' middle school plans with their high school actions.

a. Who followed through with their plans? Who didn't follow through?

b. Why do you think one group didn't follow through?

Activity C: Class wrap-up

Discuss your answers for Activities A and B.

TEACHER OVERVIEW FOR LESSON 7

Duration: One or more class periods

Purpose: To familiarize students with the technique of rounding

Student Objectives:

- To round whole numbers to the nearest ten, hundred, or thousand
- To analyze data about the families of women in the labor force

Teaching Suggestions:

Level 1: Activity A; Activity B, orally; Activities C and D

Levels 2 and 3: All activities

(You may want to use other texts to provide students with more practice in rounding.)

Vocabulary: Rounding, rounded estimate

Evaluation Activity: Activity D (for general information about the use of evaluation activities, see page xii)

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

- Rounding is a convenient way to simplify data.
- Labor statistics indicate that most women work because of economic need.

Lesson 7: Rounding

Activity A: What is rounding?

"How much money do you have?" Leroy asked.

"About \$2.00," Beth said.

Beth is using rounding—a way of estimating—to reply. Her answer, "About \$2.00," is a rounded estimate of the exact amount of money. What is the exact amount of money Beth has? Look at the illustration.



Now look at the map of Florida. About how far is it from Tallahassee to Orlando?



About how tall is Pedro?





In the illustration above, Alex has rounded the time to the nearest hour. What is the exact time?

You can see that rounding is something you do almost automatically.

Let's look at rounding more carefully. What happens when you round a number?

Do you remember the names of the places in our number system? Look at this example.

Thousand's Place	Hundred's Place	Ten's Place	One's Place
0	8	2	4

In order to understand rounding, you need to know the names of each number place.

Work these examples.

- | | | | |
|-----|--|-----|---|
| A-1 | Which digit is in the ten's place of 5,867? | A-1 | 6 |
| A-2 | Which digit is in the thousand's place of 2,347? | A-2 | 2 |
| A-3 | Which digit is in the ten's place of 1,702? | A-3 | 0 |
| A-4 | Which digit is in the hundred's place of 7,824? | A-4 | 8 |
| A-5 | Which digit is in the thousand's place of 9,158? | A-5 | 9 |
| A-6 | Which digit is in the hundred's place of 2,345? | A-6 | 3 |

Now, how do you round 1,651 to the nearest hundred?

Step 1 Find the digit in the hundred's place.

Step 2 Find the digit to the right of it.

Step 3 a. If the digit to the right is 5 or more, add 1 to the hundred's place. Then put a 0 in each place after the hundred's place.

b. If the digit to the right is less than 5, round it to 0. Then round each place after it to 0.

Answer: In rounding 1,651 to the hundred's place, we use Step 3a. This is because the number to the right of the hundred's place is 5. The answer is 1,700.

Lesson 7

When rounding, we try to make as little error as possible. In Step 3 in the previous example, we asked ourselves: "Is 1,651 closer to 1,600 or to 1,700?" It is closer to 1,700. Therefore, 1,700 is the correct answer.

A-7 1,600

A-7 Round 1,624 to the nearest hundred.

- 6 is in the hundred's place
- 2 is the digit to the right of it
- 2 is less than 5—round 2 to 0 and round each place after it to 0

What is your answer?

A-8 a. 4,600

b. 5,900

c. 1,200

d. 4,500

e. 3,700

f. 5,400

A-9 a. 4,560

b. 5,890

c. 1,230

d. 4,530

e. 3,890

f. 5,410

A-10 a. 5,000

b. 6,000

c. 1,000

d. 5,000

e. 4,000

f. 5,000

A-8 Round each of these numbers to the nearest hundred:

a. 4,563

b. 5,893

c. 1,228

d. 4,529

e. 3,689

f. 5,411

A-9 Using the same list of numbers (the original numbers in A-8), round each number to the nearest ten.

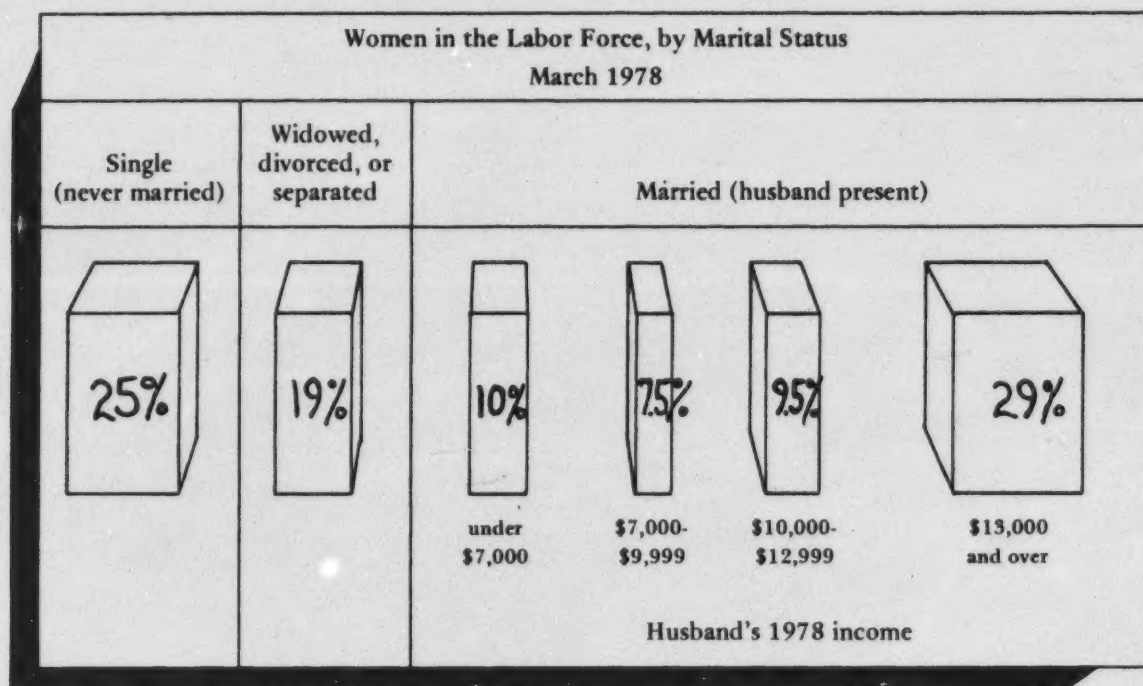
A-10 Using the same list of numbers (the original numbers in A-8), round each number to the nearest thousand.

ROUNDING

Activity B: Using rounding to think about information

Why do most women work—because they want to or because they have to?

Look at the chart below.



Source: U.S. Department of Labor, Women's Bureau.

Use the chart to answer the following questions. Round your answers to the nearest ten.

B-1 What percent of working women have no husband to support them or the family?
(Hint: Percents can be added.)

B-1 40%

B-2 10%

B-2 What percent of married women in the labor force are working to supplement a husband's income of less than \$7,000?

Lesson 7

B-3 30%

B-4 50%

B-3 What percent of women in the labor force work to supplement a husband's income of \$13,000 and over?

B-4 Using the chart, find what percent of women work because they have to. To do this, find the percent of women who have no husband to supplement their income. Then find the percent of women who are working to keep their family's income above poverty level (\$7,000). Add these two figures together.

Now look at the following table.

Mean Average Income of Families, 1977	
Mean Average Income of All Families	\$18,264
Type of Family	
Male head wage earner	19,686
Married, wife present	19,798
Wife a full-time worker	20,128
Wife not a full-time worker	14,984
Widowed, divorced, or separated	17,573
Female head wage earner	9,811

Source: *Statistical Abstract 1978*. U.S. Department of Commerce, Bureau of the Census, p. 459.

Use the table to answer the questions below.
Round your answers to the nearest hundred.

B-5 a. \$19,700

b. \$ 9,800

B-6 a. \$20,100

b. \$15,000

B-5 a. What is the mean average income of families whose head wage earner is a male?

b. What is the mean average income of families whose head wage earner is a female?

B-6 a. What is the mean average income of families in which the wife is a full-time worker?

b. What is the mean average income of families in which the wife is not a full-time worker?

Activity C: Class wrap-up

- C-1 Check your answers for Activities A and B.
- C-2 They work because of economic need.
- C-2 What did you find out about why women work?
- C-3 Women often don't prepare for a career, since they assume (and others encourage them to assume) they won't have to work. As a result, they often get trapped in low-paying jobs. Also, our society often discriminates against women, paying them less than men for the same kind of work and paying them less for traditionally female jobs.
- C-3 Why do you think the mean average income of families whose head wage earner is female is so much lower than that of families whose head wage earner is male?



Activity D: Flight check

Did you understand this lesson? To find out, answer the following questions without looking back at the lesson. Then, your teacher will help you check your answers.

- D-1 a. 400
b. 1,900
c. 38,100
d. 38,000
- D-1 Round the following numbers to the nearest hundred.
- a. 378
b. 1,899
c. 38,098
d. 38,001
- D-2 a. 1,000
b. 380
c. 30
d. 70
- D-2 Round the following numbers to the nearest ten.
- a. 999
b. 384
c. 34
d. 66

TEACHER OVERVIEW FOR LESSON 8

Duration: One or more class periods

Purpose: To familiarize students with the concepts of ratio and percent

Student Objectives:

- To find ratios
- To convert ratios to percents and percents to ratios
- To identify ratios and percents pertaining to a profile of women in the labor force
- To state reasons for the rise in the percentage of women in the labor force

Teaching Suggestions:

All levels: All activities

(Level 1 students may need more help with this material. You may want to use other texts to provide students with more practice in finding ratios and percents.)

Vocabulary: Ratio, fraction, percent

Evaluation Activity: Activity D (for general information about the use of evaluation activities, see page xii)

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

- A majority of working women are married.
- The percentage of women in the labor force doubled between 1920 and 1975.*
- Reasons for the increased participation of women in the labor force include the following:
 - (1) Many people in our society are changing their attitudes about the role of women.
 - (2) Many women are choosing to have fewer children, and therefore have more time to work outside the home.
 - (3) Women receive a better education now than in previous decades.
 - (4) Employment opportunities for women have recently expanded.
 - (5) The rising cost of living creates an economic need for women to work.
 - (6) An increasing number of women are divorced.

*Statistical Abstracts of the United States (Washington, D.C.: U.S. Department of Commerce, Bureau of the Census, 1976).

Lesson 8: Ratios and Percents

Activity A: What are ratios and percents?

A comparison of two sets of numbers is called a ratio. For example:

if $A = \{ \square \square \}$

and $B = \{ \blacksquare \blacksquare \blacksquare \blacksquare \blacksquare \}$,

then the ratio of A to B is 2 to 5. (The ratio of B to A is 5 to 2.)

A ratio can be written in any of the following ways:

2 to 5 $2/5$ 2:5

Usually ratios are reduced to the lowest possible numbers. For example, 4 to 10 can be reduced to $2/5$ by dividing each part of the ratio by 2. Two is the lowest common denominator (or divisor) of this ratio, and the smallest whole number that can be divided into both parts.

Lesson 8

Using a fraction—for example, $\frac{2}{5}$ —is the most common way to express a ratio.



A-1 2

A-2 $\frac{1}{2}$

A-3 $\frac{1}{2}$; $\frac{1}{2}$

A-4 $\frac{1}{1}$; $\frac{1}{1}$

A-5 50

A-6 a. $\frac{3}{6} = \frac{1}{2}$

b. $\frac{4}{1}$

c. $\frac{2}{4} = \frac{1}{2}$

A-1 How many parts are there in this set?

A-2 What fraction of the circle is shaded?

A-3 What fraction of the people in the circle are men? Women?

A-4 What is the ratio of women to men? Men to women?

A-5 Imagine that the circle represents people in the United States. If there were 100 people in the United States, how many of them would be women?

A-6 What are the ratios of these sets:

a. Set 1: ▲▲▲

Set 2: ▲▲▲▲▲▲

b. Set 1: ○○○○

Set 2: ○

c. Set 1: ■■

Set 2: ■■■■

Your answer to A-5 was a percent. Percent means per hundred, or by the hundred. The symbol for a percent is %.

- A-7 How many people do you think the United States really has? In 1978, there were about 220,000,000 people in the United States. Assume that 50% of them were women. How many women were there?

$$\begin{aligned}\text{NUMBER OF WOMEN} &= 50\% \times 220,000,000 \\ &= .50 \times 220,000,000 \\ &= \frac{50}{100} \times 220,000,000 \\ &= \frac{1}{2} \times 220,000,000\end{aligned}$$

- A-7 110,000,000
A-8 Variety of answers
A-9 a. 75%
b. 33.3%
c. 90%
A-10 a. 2/5
b. 1/3
c. 1/4

- A-8 Count the number of girls and the number of boys in your math class.

- a. What is the ratio of boys to girls?
b. What is the ratio of girls to boys?

- A-9 Change these ratios (fractions) to percents:

Example: $\frac{1}{2}$ $\begin{array}{r} .50 \\ 2 \overline{)1.00} \\ \underline{-10} \\ 0 \end{array} = 50\%$

- a. $\frac{3}{4}$
b. $\frac{1}{3}$
c. $\frac{9}{10}$

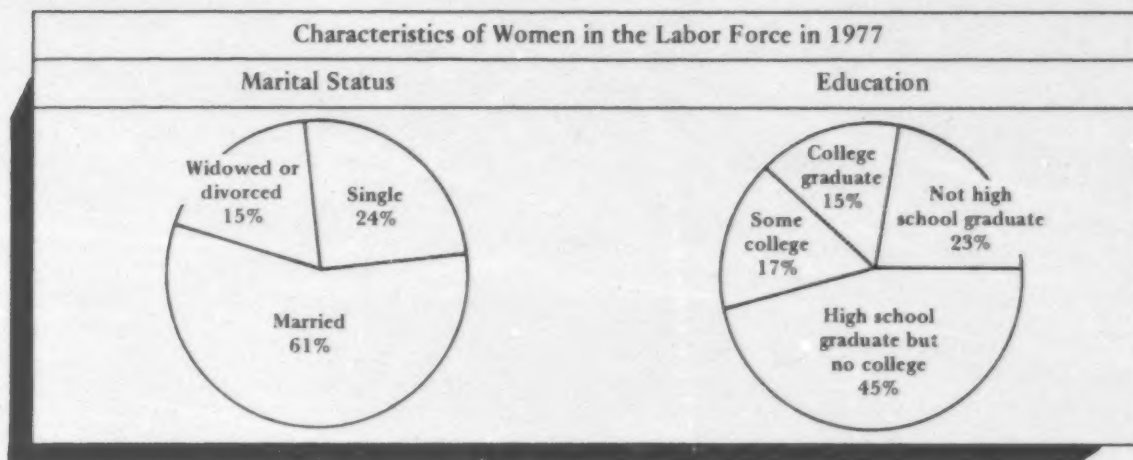
- A-10 Change these percents to fractions:

Example: $70\% = \frac{70}{100} = \frac{7}{10}$

- a. 40%
b. 33%
c. 25%

Activity B: Using percents

Percents are often used in graphing data. For example, look at the circle graphs below.



Source: *Statistical Abstract 1978*. U.S. Department of Commerce, Bureau of the Census, pp. 400 and 404.



From these circle graphs, we can make the following statements:

- 61% of working women are married
- 15% of working women are college graduates
- 23% of working women did not graduate from high school
- 15% of working women are widowed, divorced, or separated

Use the circle graphs to answer these questions:

- | | | | |
|-----|--|-----|---------------|
| B-1 | In 1977, what percent of working women were single? | B-1 | 24% |
| B-2 | What percent of working women had graduated from high school but not attended college? | B-2 | 45% |
| B-3 | What percent of working women had attended college, but not graduated? | B-3 | 17% |
| B-4 | What percent of working women were single, widowed, or divorced? | B-4 | 39% |
| B-5 | What fraction of working women were single? | B-5 | 6/25 |
| B-6 | What was the ratio of single women to women who were widowed or divorced? | B-6 | $24/15 = 8/5$ |
| B-7 | Find these percents: | B-7 | a. 24 |
| | | | b. 3.5 |
| | | | c. 55.2 |
| | | | d. 686 |
| | | | e. 4 |

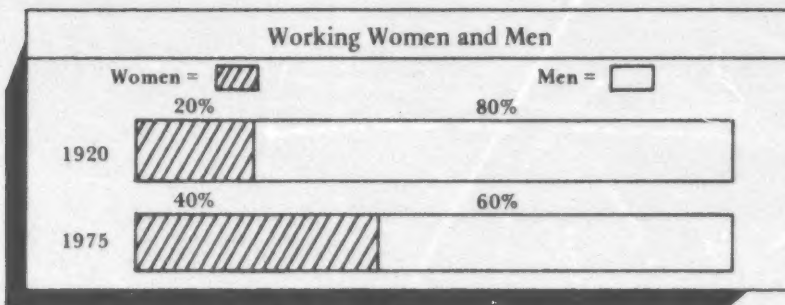
Example: 60% of 324 =

$$\begin{array}{r} 324 \\ \times .60 \\ \hline 19440 \end{array}$$

- 80% of 30
- 35% of 10
- 92% of 60
- 50% of 1,372
- 25% of 16

Activity C: Percent of women and men in the labor force

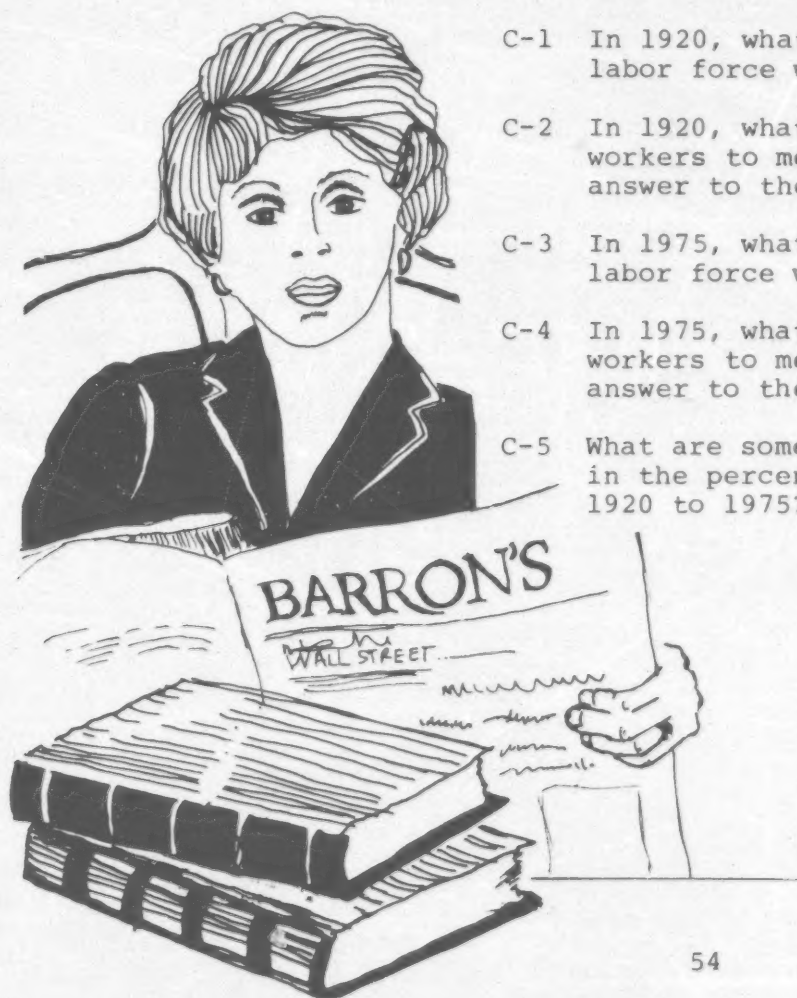
Look at the graph below and answer the questions that follow.



Source: *Women Workers Today*. U.S. Department of Labor, Women's Bureau, 1976.

- C-1 20%
- C-2 $\frac{1}{4}$
- C-3 40%
- C-4 $\frac{2}{3}$
- C-5 See Background on Teacher Overview page for lesson 8

- C-1 In 1920, what percent of people in the labor force were women?
- C-2 In 1920, what was the ratio of women workers to men workers? (Reduce your answer to the lowest common denominator.)
- C-3 In 1975, what percent of people in the labor force were women?
- C-4 In 1975, what was the ratio of women workers to men workers? (Reduce your answer to the lowest common denominator.)
- C-5 What are some reasons for the increase in the percentage of women workers from 1920 to 1975?



Activity D: Class wrap-up

- D-1 Check your answers for Activities A, B, and C.
- D-2 As a class, compare the reasons you gave for C-5. Which reasons are probably the most important in explaining the increase in the percentage of women workers?

D-2 Women are having fewer children and women are working because of economic need.

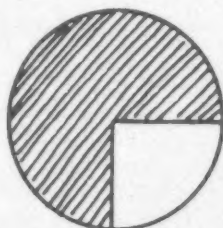


Activity E: Flight check

Did you understand this lesson? To find out, answer the following questions without looking back at the lesson. Then, your teacher will help you check your answers.

- E-1 In this circle, what is the ratio of the shaded part to the unshaded part?

E-1 3/1



- E-2 What are the ratios of these sets?

E-2 a. 5/2

- a. Set 1: ○ ○ ○ ○ ○
Set 2: ○ ○

b. 1/8

- b. Set 1: □
Set 2: ○ ○ ○ ○ ○

Lesson 8

- E-3 a. 50%
b. 75%
c. 87.5%

- E-4 a. $\frac{3}{5}$
b. $\frac{3}{20}$
c. $\frac{1}{4}$

E-3 Change these ratios to percents:

- a. $\frac{1}{2}$
b. $\frac{3}{4}$
c. $\frac{7}{8}$

E-4 Change these percents to fractions.
Reduce them to the lowest common denominator.

- a. 60%
b. 15%
c. 25%

TEACHER OVERVIEW FOR LESSON 9

Duration: One or more class periods

Purpose: To introduce students to the nature and use of pictographs

Student Objectives:

- To construct a pictograph from given data
- To use data in pictographs to form generalizations about family size in the past and present

Teaching Suggestions:

Level 1: Activity A, orally (do A-3 on the chalkboard);
Activities B and C

Levels 2 and 3: All activities

Vocabulary: Pictograph

Evaluation Activity: None (you may use B-6 as an evaluation activity)

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

- A pictograph is a graph that uses pictures to show relationships between variables.
- The number of working women is increasing.
- Families in the United States today are smaller than they were in 1900.

Lesson 9: Pictographs

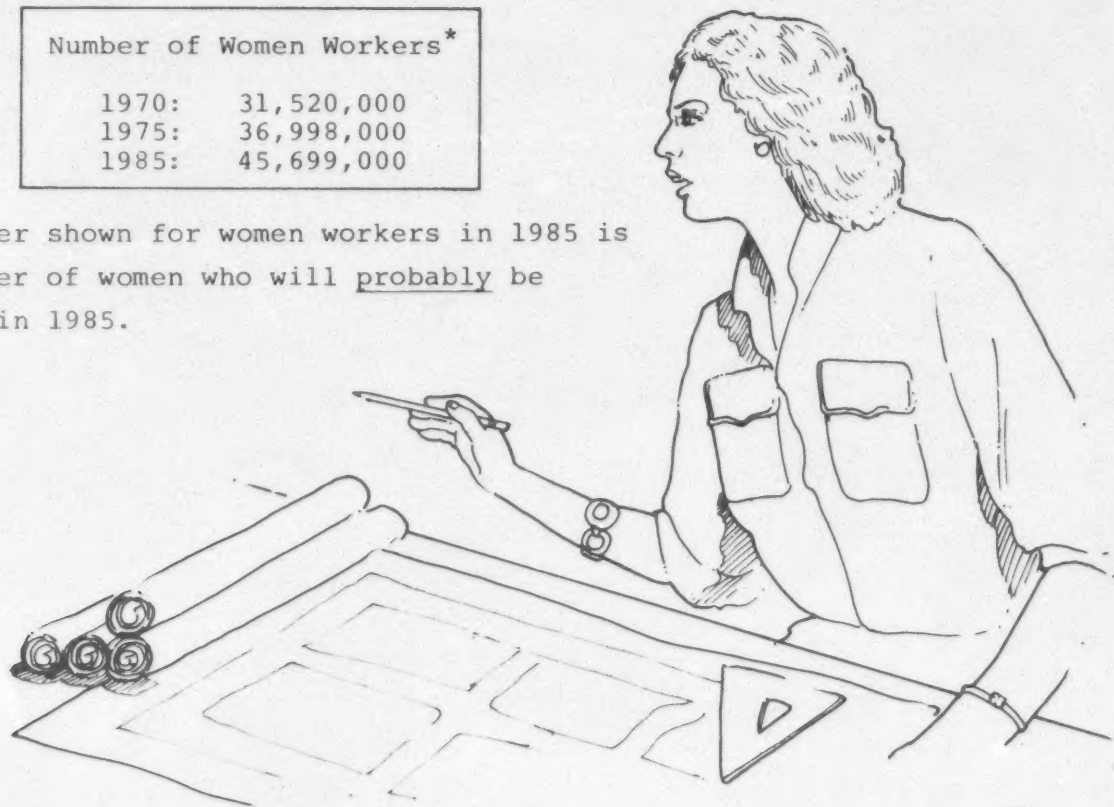
Activity A: What are pictographs?

Often we use pictures to represent numbers. Graphs that present data in such a way are called pictographs.

Look at these data:

Number of Women Workers*	
1970:	31,520,000
1975:	36,998,000
1985:	45,699,000

The number shown for women workers in 1985 is the number of women who will probably be working in 1985.



*Source: *U.S. Working Women: A Databook*. U.S. Department of Labor, Bureau of Labor Statistics, 1977, p. 36.

Lesson 9

In the pictograph below, these numbers are represented by pictures. As the key shows, each picture stands for five million women workers.

Number of Women Workers	
Key:	 = 5,000,000  = 2,500,000
Year	Number of Women Workers
1970	      
1975	       
1985	        

(Pictographs are drawn to the nearest 2½ million of data.)

A-1 Increase

A-2

Median Income for Men in 1975	
Key:	 = \$2,000  = \$1,000
Job	Amount of Money
Managers	     
Clerical Workers	    
Service Workers	   
Professionals	     

A-1 Did the number of women workers from 1970 to 1975 increase or decrease?

A-2 Here are some more data. Use the data to complete a pictograph like the one below.

Median Income for Men in 1975*

Managers: \$16,000
 Clerical Workers: 12,000
 Service Workers: 9,000
 Professionals: 16,000

Median Incomes for Men in 1975	
Key:	 = \$2,000  = \$1,000
Job	Amount of Money

*Source: U.S. *Working Women: A Databook*. U.S. Department of Labor, Bureau of Labor Statistics, 1977 p. 36.

- A-3 Make a pictograph showing the median income of women for the same jobs. Use the data given below. Be sure to title your pictograph and show the key.

Median Income for Women in 1975*

Managers:	\$ 9,000
Clerical Workers:	8,000
Service Workers:	5,000
Professionals:	10,000

A-3

Median Income for Women in 1975	
Key: \$ = \$2,000 \$ = \$1,000	
Job	Amount of Money
Managers	\$\$\$\$\$
Clerical Workers	\$\$\$\$
Service Workers	\$\$\$
Professionals	\$\$\$\$\$

Activity B:

Average number of children per family

Form a group with four or five other students and do this activity together. Everyone in the group should do each problem.

As you can see from the first pictograph, more and more women are working. Today, more than half of all women between the ages of 18 and 64 are working.

There are many reasons for the fact that more women are working. For one thing, it is easier for women to work if they have fewer children. Look at the pictograph on the next page.

*Bureau of the Census, *Statistical Abstracts of the U.S.*, 1976
U.S. Department of Commerce

Lesson 9

Average Number of Children per Family	
Key:	♀ = 1 child ♂ = ½ child
1900	♀ ♀ ♀ ♀ ♀
1975	♀ ♀ ♂

Source: U.S. Department of Commerce, Bureau of the Census.

B-1 The number of children per family has decreased since 1900.

B-1 What general statement can you make from this pictograph?

B-2 In your group, find the average number of children in each person's family. To do this, each member of the group should answer the following questions.

- How many brothers and sisters does your mother have?
- How many brothers and sisters does your father have?
- How many brothers and sisters do you have?



- B-3 Now combine the responses of your group members. To do this, fill in a form like the one below. Make sure to include yourself and each group member as you fill in the number of children in each student's family.

Number of Children			
	Mother's family	Father's family	Student's family
Student 1	_____	_____	_____
Student 2	_____	_____	_____
Student 3	_____	_____	_____
Student 4	_____	_____	_____
Student 5	_____	_____	_____
Total:	_____	_____	_____
Average:	_____	_____	_____

- What is the average number of children in the families of the mothers in your group?
 - What is the average number of children in the families of the fathers in your group?
 - What is the average number of children in the families of the students in your group?
- B-4 In general, are the families of your mothers and fathers larger or smaller than your own families?
- B-5 Make a pictograph showing the results of your group's averages. Use the graph below to guide you.

Average Number of Children in Our Families	
Key:	☺ = ONE CHILD
Mother's family	
Father's family	
Student's family	

B-6 Look at the pictograph on page 60.

- a. Is the average family size in your group larger or smaller than the average family size in 1900?
- b. Is the average family size in your group larger or smaller than the average family size in 1975?

Activity C:
Class wrap-up

C-1 Check your answers for Activities A and B.

C-2 Smaller; more methods of birth control have afforded people more choice.

C-2 Are families larger or smaller today than they were in 1900? Why?

C-3 Yes; with fewer children many women feel it is not necessary to stay at home.

C-3 Does the decrease in family size affect the number of women who work? Explain your answer.

TEACHER OVERVIEW FOR LESSON 10

Duration: One or more class periods

Purpose: To introduce students to the purpose and interpretation of histograms

Student Objectives:

- To construct a histogram
- To use data in histograms to generalize about the occupations of women and men

Teaching Suggestions:

Level 1: Activity A, orally; Activities B and C

Levels 2 and 3: All activities

Vocabulary: Histogram

Evaluation Activity: None (you may use Activity B as an evaluation activity)

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

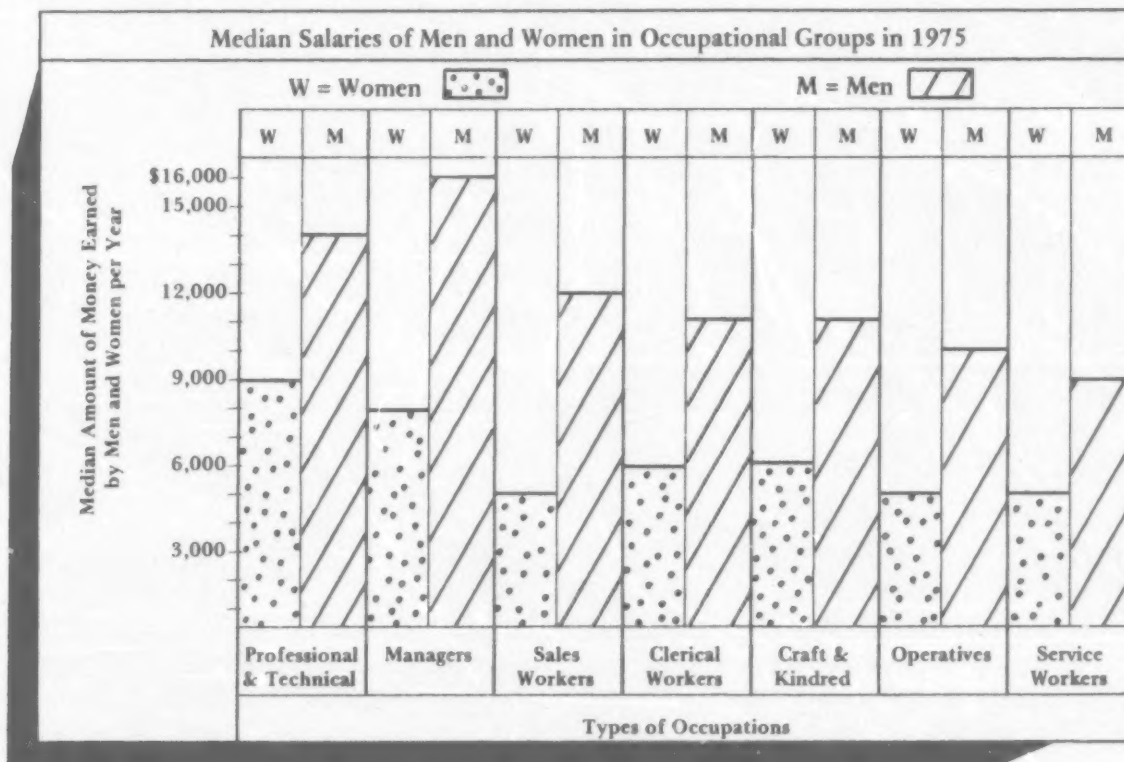
- A histogram is one kind of bar graph. (You may need to explain this concept to students in more detail.)
- Women are concentrated in low-paying occupational groups such as clerical and service work rather than in high-paying occupational groups such as managerial work.
- Women in the same occupational groups as men often earn less than men, because women tend to be in the lowest paying jobs within those occupational groups.

Lesson 10: Histograms

Activity A: What is a histogram?

You may do this activity by yourself or with your class.

The graph below is called a histogram. A histogram is a kind of bar graph. It is easy to understand data on a histogram. This histogram shows the median salary for men and women in certain occupations.



Source: *The Earnings Gap between Women & Men*. U.S. Department of Labor, Women's Bureau, 1976.

Lesson 10

Use the histogram to find the answers to the following questions.

- A-1 \$5,000
- A-2 Operatives
- A-3 Managers
- A-4 Sales workers
- A-5 \$9,000
- A-6 \$7,000
- A-7 \$8,000

A-1 How much money do women sales workers earn?

Step 1 Find the column for sales workers on the bottom of the graph.

Step 2 Find the part of the column that pertains to women sales workers.

Step 3 Move to the top of the column. Then move across to the left at the top of the shaded part of the column.

A-2 In which occupational group do men earn a median salary of \$10,000?

Step 1 Find the line indicating \$10,000 on the side of the graph.

Step 2 Move across the graph until you find a column corresponding to \$10,000.

Step 3 Move down the column to see what job group it represents.

A-3 In which occupational group do women earn a median salary of \$8,000?

A-4 In which occupational group do men earn a median salary of \$12,000?

A-5 What is the median salary of women professional and technical workers?

A-6 What is the difference in the median salaries of men and women sales workers?

A-7 The median salary of male managers is how much higher than the median salary of female managers?

The seven occupational groups in this histogram include many different kinds of jobs. Here are some examples of jobs in each group.

- Professional and technical workers:

Examples are school teachers, university professors, doctors, nurses, lawyers, laboratory technicians, accountants, engineers, computer programmers



- Managers and administrators: Examples are bank officers, store managers, school principals, university presidents, people in charge of government offices

- Sales workers: Examples are sales clerks in stores, real estate agents, insurance agents



- Clerical workers: Examples are secretaries, postal clerks, bookkeepers, cashiers, bank tellers
- Craft and kindred workers: Examples are automobile mechanics, electricians, carpenters, bakers, plumbers



- Operatives: Examples are machine welders, seamstresses, gas station attendants, bus drivers
- Service workers: Examples are cleaners, cooks, waiters and waitresses, nursing aides, hairdressers



Activity B: Comparing female and male workers

B-1 Look at the following frequency table.

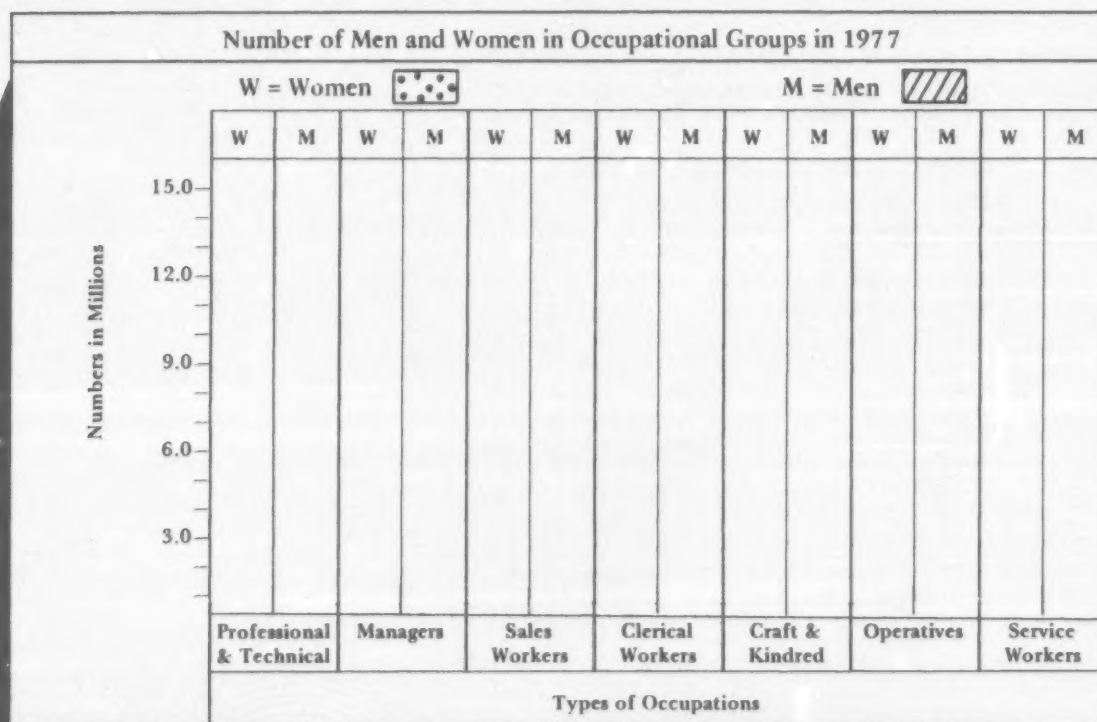
B-1 Answer on page 68

Number of Men and Women in Occupational Groups in 1977		
Occupation	Women	Men
Clerical Workers	12,700,000	3,400,000
Service Workers	7,700,000	4,700,000
Professional and Technical	5,800,000	7,800,000
Operatives	4,200,000	6,300,000
Sales Workers	2,500,000	3,300,000
Managers	2,200,000	7,500,000
Craft and Kindred	600,000	11,300,000

Source: *Statistical Abstract 1978*. U.S. Department of Commerce, Bureau of the Census, p. 418.

Note: Numbers are rounded to the nearest hundred thousand.

Use the information on the frequency table to fill in a histogram like the one below.



Lesson 10

B-1 Answer below

B-2 Clerical workers, service workers

B-3 Low paying

B-2 Which occupations have more women than men?

B-3 Do you think the occupations that have more women than men are high-paying or low-paying, compared with the other occupations? (Hint: Look at the first histogram again.) Why?

Activity C: Class wrap-up

C-1 Check your answers for Activities A and B.

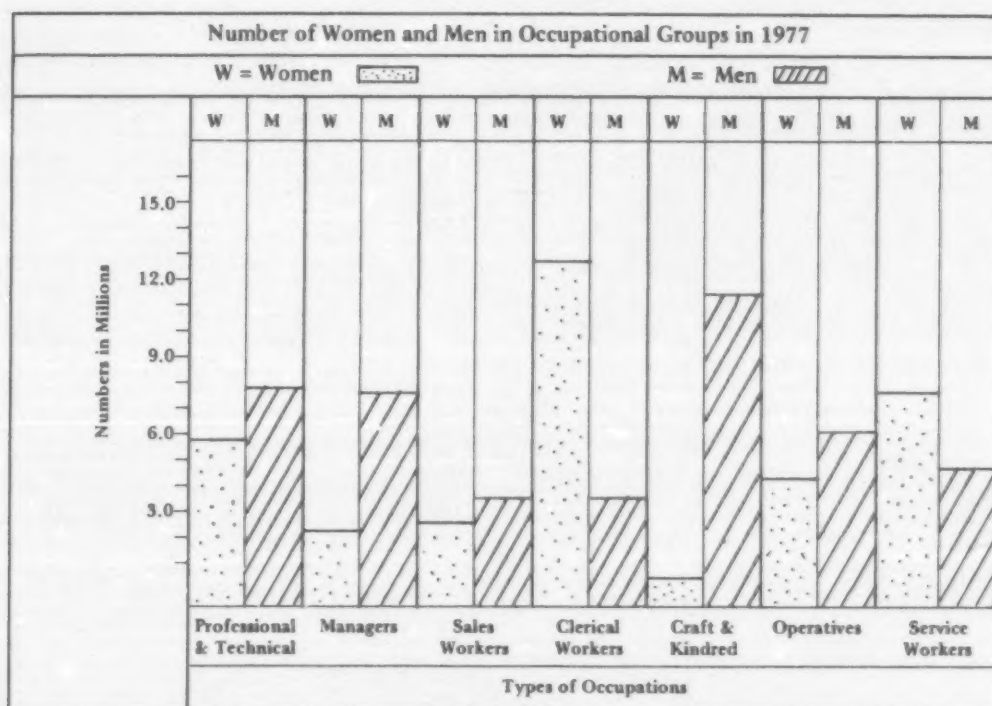
C-2 Discuss your answers to B-3.

C-3 They are realizing that they can do nontraditional jobs equally well and can receive better pay in these jobs.

C-3 Why are more and more women moving out of traditionally female careers and into traditionally male careers?

C-4 If you were ready to go to college, what career would you prepare for? Why?

B-1



TEACHER OVERVIEW FOR LESSON 11

Duration: One or more class periods

Purpose: To help students use data from histograms to analyze information about the schooling of females and males

Student Objectives:

- To construct and interpret a histogram
- To hypothesize about why women often receive less pay than men

Teaching Suggestions:

All levels: All activities

Vocabulary: No new words

Evaluation Activity: None (you may use Activity B as an evaluation activity)

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

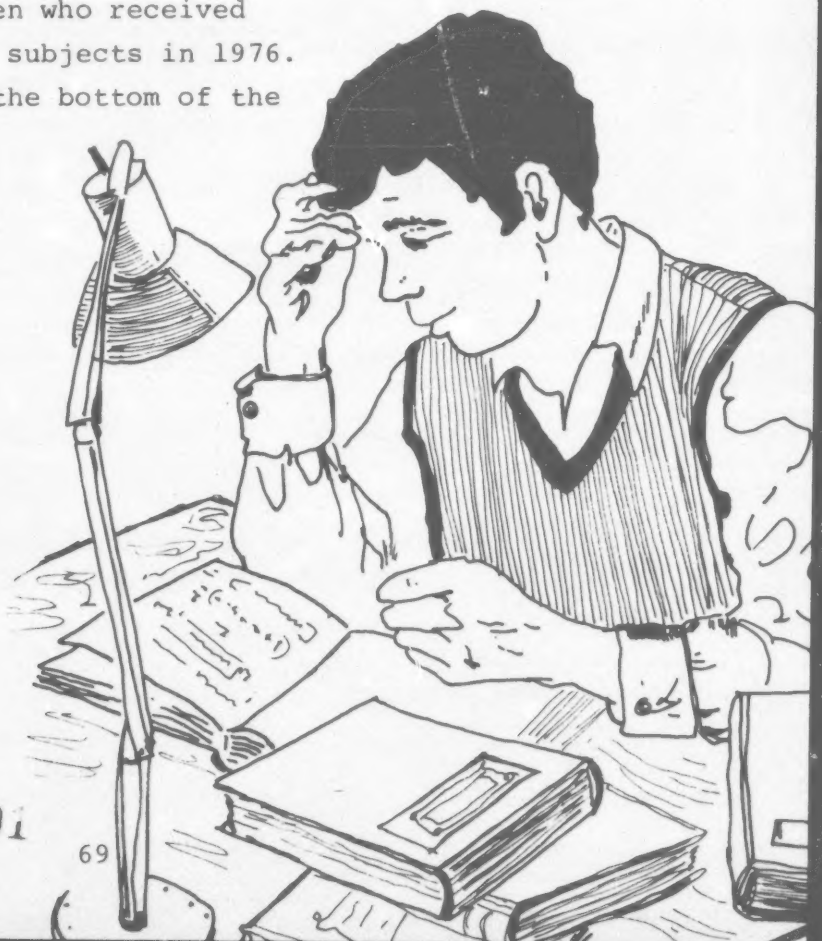
- Some disciplines in college have a high concentration of males, while other disciplines have a high concentration of females.
- Disciplines that lead to high-income careers tend to have a high concentration of males.
- The number of women enrolling in college has increased steadily in the past few decades.

Lesson 11: **More Practice with Histograms**

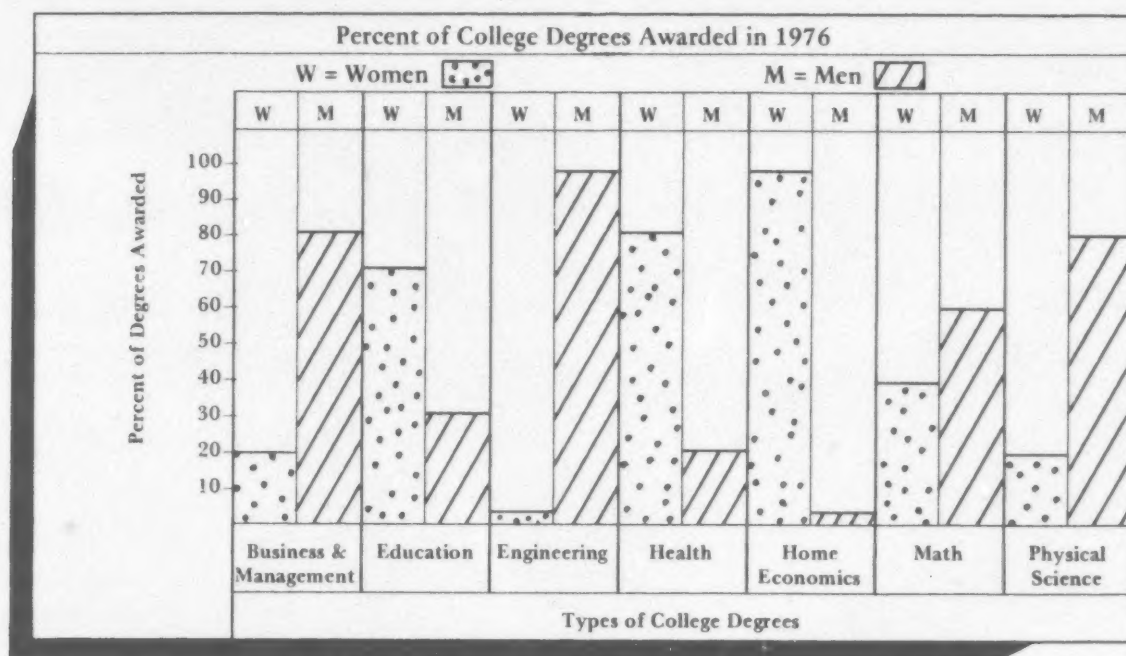
Activity A: College courses

In the last lesson, you saw that some jobs are held by more men than women. Other jobs are held by more women than men.

The courses people take in college help determine what jobs they will have after graduation. The following histogram shows the percent of women and men who received college degrees in certain subjects in 1976. The subjects are shown at the bottom of the histogram.



Lesson 11



Source: Brown, George H. *Bachelor's Degree Awards to Women*. U.S. Department of Health, Education, and Welfare, Education Division, pp. 8-9.

Use the histogram to answer the following questions.

A-1 20%

A-2 60%

A-3 70%

A-4 Engineering, home economics

A-5 a. Home economics

b. It is a traditional area for females

A-1 What percent of degrees in business and management were awarded to women?

A-2 What percent of degrees in mathematics were awarded to men?

A-3 What percent of degrees in education were awarded to women?

A-4 In which subject(s) is the difference between the percent of women and men the greatest?

A-5 a. Which subject has the highest percentage of women?

b. Why do you think there are so many more women than men in that subject?

A-6 a. Which subject has the highest percentage of men?

b. Why do you think there are so many more men than women in that subject?

A-7 Which subjects do you think lead to better-paying jobs than others?

A-6 a. Engineering

b. It is a traditional area for males

A-7 Business and management, engineering, math, physical science (all traditionally male areas)

Activity B (discussion): Comparing females and males in college courses

Discuss your answers for Activity A.

Activity C: Comparing female and male college enrollments

C-1 Make a histogram based on the information in the frequency table below.

C-1 See chart at end of chapter for answer.

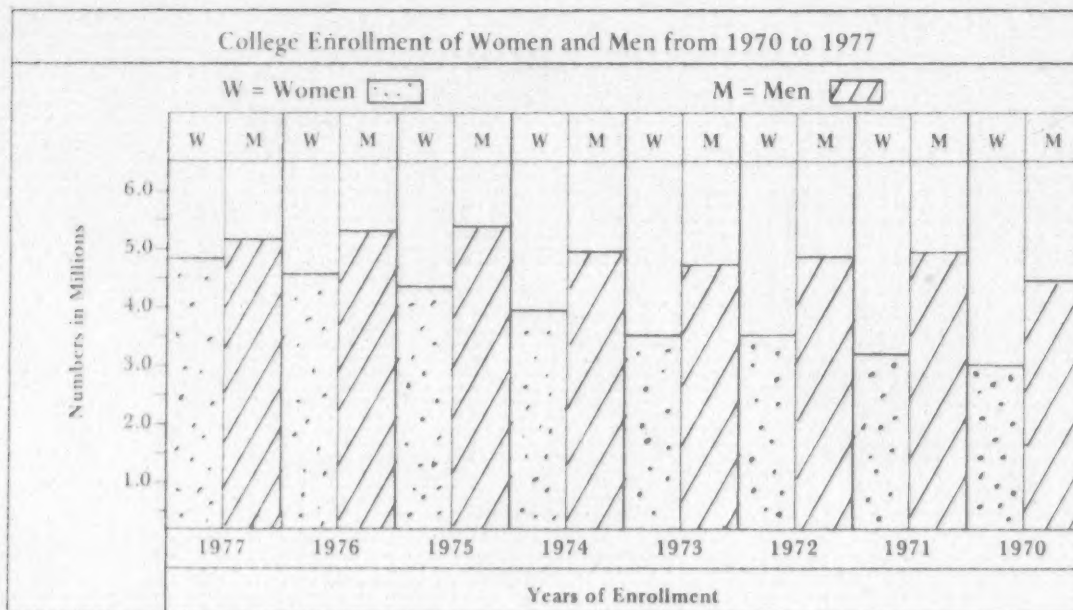
(Hint: Round the numbers to the nearest hundred thousand for scale. For example, 5,369,000 would be rounded to 5,400,000 on the histogram.)

College Enrollment of Women and Men from 1970 to 1977		
Year	Women	Men
1977	4,848,000	5,369,000
1976	4,654,000	5,296,000
1975	4,355,000	5,342,000
1974	3,901,000	4,926,000
1973	3,502,000	4,677,000
1972	3,460,000	4,853,000
1971	3,236,000	4,850,000
1970	3,013,000	4,401,000

Source: *Statistical Abstract 1978*. U.S. Department of Commerce, Bureau of the Census, p. 160.

C-2 What are some of the reasons for the fact that women are often paid less than men? Think of information from this lesson and from the previous lesson on histograms.

C-2 Reasons for differences in salaries are complex, involving amount and kind of education, experience, and sex discrimination.



TEACHER OVERVIEW FOR LESSON 12

Duration: One or more class periods

Purpose: To introduce students to the purpose and interpretation of line graphs

Student Objectives:

- To construct and interpret a line graph
- To use data from a line graph to generalize about trends in education for women and men

Teaching Suggestions:

All levels: All activities

Vocabulary: Line graph

Evaluation Activity: None (you may use Activity B as an evaluation activity)

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

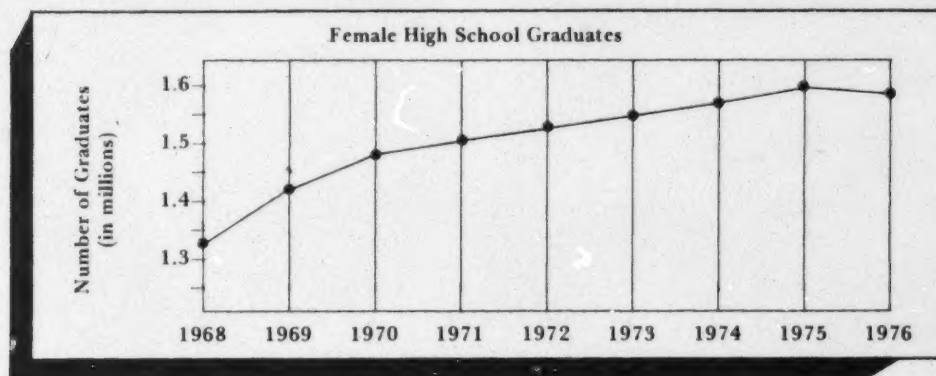
- The number of women and men graduating from high school increased steadily from 1962 to 1975.*
- More male than female high school graduates enroll in college immediately after high school. (However, recent statistics show that enrollment is now almost half females and half males.)

*Bureau of the Census, *Statistical Abstracts of the U.S.*, 1976, Department of Commerce.

Lesson 12: Line Graphs

Activity A: What is a line graph?

Line graphs are often used to show how facts change as time passes. Study the following line graph.



Source: *Statistical Abstract 1978*. U.S. Department of Commerce, Bureau of the Census, p. 159.

On the graph, the number of women is given in millions. That is, 1.6 means 1,600,000. A point halfway between 1.5 and 1.6 means 1,550,000.

Use the graph to answer these questions.

A-1 What was the increase in female high school graduates from 1974 to 1975?

A-1 Approximately 30,000

A-2 In which year was the increase the greatest?

A-2 1969

A-3 In which year was there a decrease?

A-3 1976

Lesson 12

Here are some data on the number of male high school graduates.

Year	Number of Men
1968	1,340,000
1969	1,400,000
1970	1,400,000
1971	1,450,000
1972	1,500,000
1973	1,500,000
1974	1,500,000
1975	1,550,000
1976	1,600,000

Source: *Statistical Abstract 1978*. U.S. Department of Commerce, Bureau of the Census, p. 159.

A-4 See chart at end of chapter for answer.

A-4 Make a line graph similar to the one you just studied. Use the title "Male High School Graduates" for your line graph. Use the information above to complete your line graph, following these steps:

Step 1 Look at each part of the data—for example, 1968, 1,340,000.

Step 2 Find 1968 at the bottom of your graph.

Step 3 Find 1,340,000 on the left side of your graph.

Step 4 Put a dot at the point where 1968 and 1,340,000 meet.

Step 5 Repeat this process for all the data.

Step 6 Use lines to connect the dots.

A-5 50,000

A-6 1969

A-7 None

A-5 What was the increase in male graduates from 1970 to 1971?

A-6 In which year was the increase in male graduates the greatest?

A-7 In which year was there a decrease in male graduates?

Activity B: Comparing college enrollments

Sometimes we put two sets of data on one line graph. This helps us to compare the data.

Here are some data on the percent of high school graduates who went directly to college.

Year of Graduation	Percent of Women	Percent of Men
1962	43	55
1963	39	52
1964	41	57
1965	45	57
1966	43	59
1967	47	58
1968	49	63
1969	47	60
1970	49	55
1971	50	58
1972	46	53

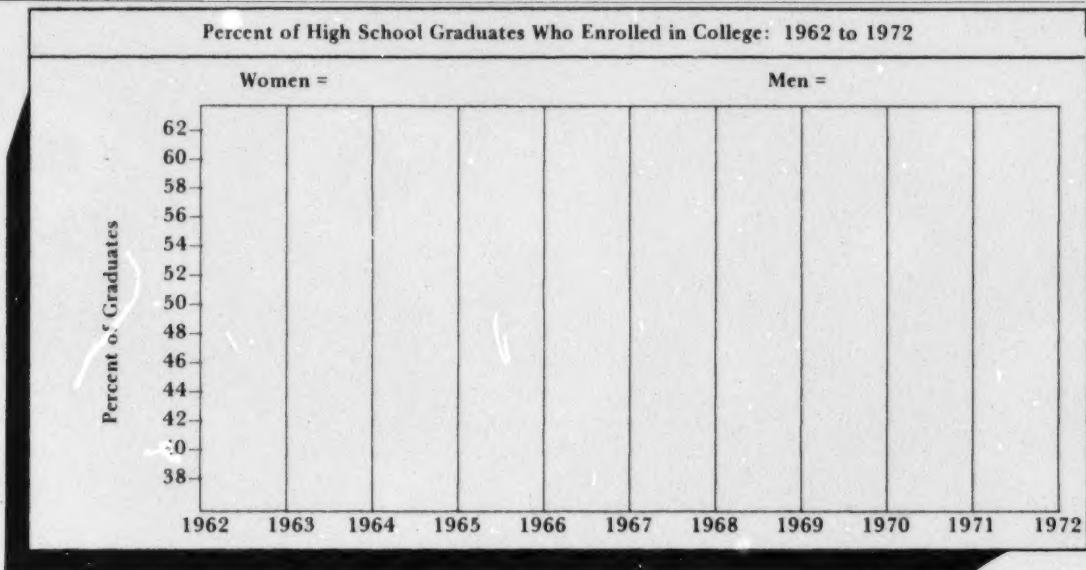
Source: 1975 *Handbook on Women Workers*. U.S. Department of Labor, Women's Bureau, pp. 198, 199.

The percentages are for female and male high school graduates attending college. For example, find the number 43 under the column for percent of women. This means that 43 percent of all female high school graduates in 1962 went to college that year.

Lesson 12

B-1 See chart at end of chapter for answer.

B-1 Use the preceding data to make a line graph like the one below. You will have two sets of lines: one for the data about women and one for the data about men. Draw a dotted line for women and a solid line for men.



B-2 Male

B-3 1964 and 1966, 1970

B-4 In no year

B-5 Fewer women than men go to college directly from high school

B-2 Did a higher percent of female or male high school graduates attend college?

B-3 During which years was there the most difference between the percent of men and women attending college? The least difference?

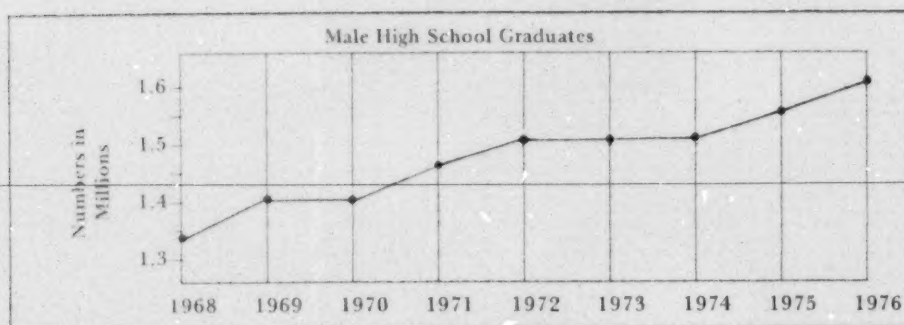
B-4 During which year was the percent of females attending college higher than the percent of males?

B-5 What are some other conclusions (general statements) you can make from this graph?

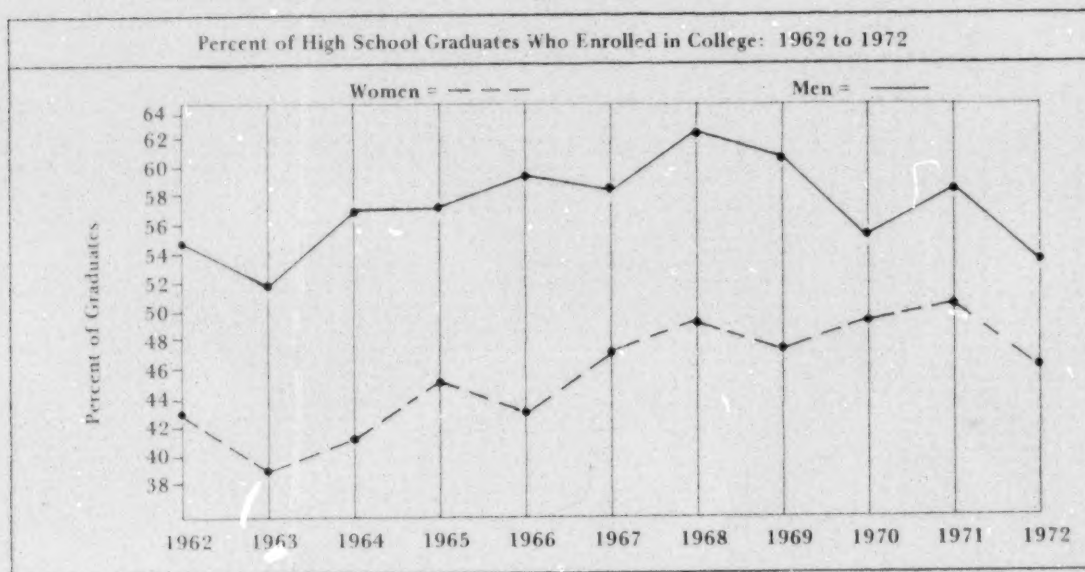
Activity C: Class wrap-up

Discuss your answers for Activities A and B.

A-4



B-1



TEACHER OVERVIEW FOR LESSON 13

Duration: One class period

Purpose: To introduce students to the purpose and interpretation of circle graphs

Student Objectives:

- To construct and interpret a circle graph
- To use data from circle graphs to generalize about the problems of women in the labor force

Teaching Suggestions:

All levels: All activities

Vocabulary: Circle graph

Evaluation Activity: Activity C (for general information about the use of evaluation activities, see page xii)

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

- The average woman today in the United States works outside the home for a major part of her life.
- In almost half of all families having both a wife and a husband, both the wife and the husband work to support the family.

Lesson 13: **Circle Graphs**

Activity A: **What is a circle graph?**

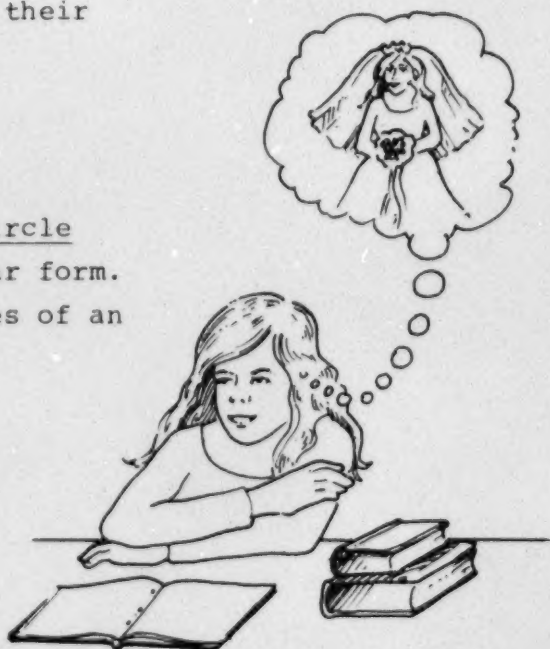
Some students plan their future carefully. Others have no idea what their career will be.

Girls often plan to get married after high school. They may plan to be supported by their husbands for the rest of their lives.

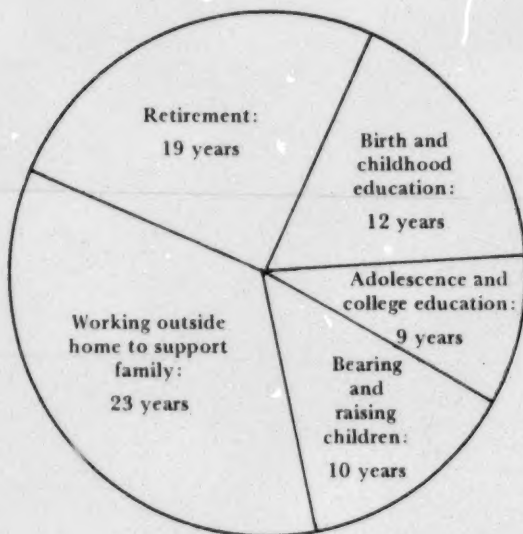
Boys often plan to work in a career. They plan to marry a woman who will raise their children.

But what really happens?

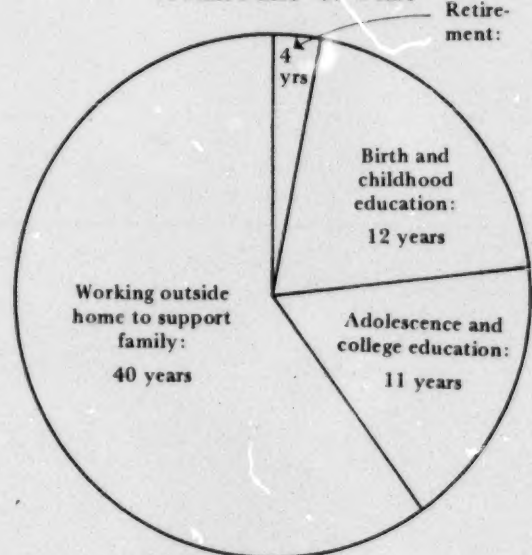
To find out, look at the following circle graphs, which present data in circular form. These graphs help us compare the lives of an average American woman and man.



A Woman's Life—73 Years



A Man's Life—67 Years



Source: U.S. Department of Labor, Bureau of Labor Statistics.

Many women are spending fewer years working inside the home and a greater number of years working outside the home. A study shows that in 1977, 47 percent of all women aged 16 years or older were working.*

Of these working women:

- 24% were single
- 15% were widowed, divorced, or separated
- 61% were married

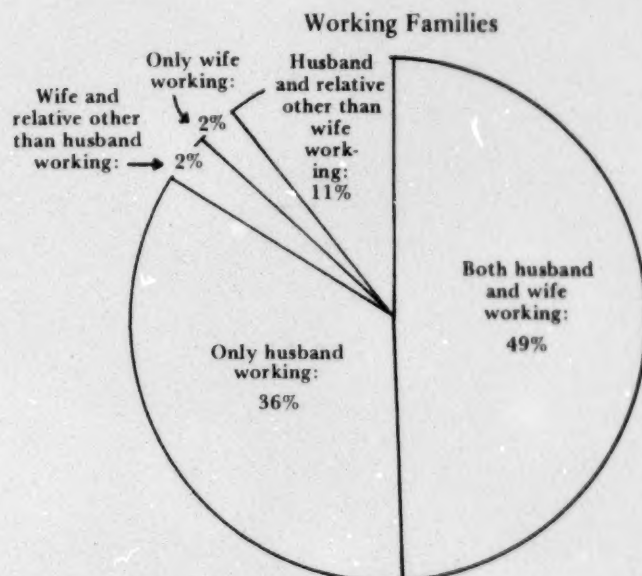
A-1 Working Women: 1977



A-1 Make a circle graph to show these statistics on working women. Make sure to title your graph and label its parts.

*Source: Statistical Abstract 1978. U.S. Department of Commerce, Bureau of the Census, p. 404.

In 1972, a survey showed that in most families the husband is not the only one who works outside the home. Study the circle graph below and use it to answer the questions that follow.



Source: 1975 *Handbook on Women Workers*. U.S. Department of Labor, Women's Bureau, p. 139.

- A-2 In what percent of the husband-wife families do both the husband and the wife work?
- A-3 In what percent of the husband-wife families does the husband not work?
- A-4 In what percent of the husband-wife families does only the husband work?

A-2 49%

A-3 4%

A-4 36%

Activity B: Class wrap-up

B-1 Check your answers for Activity A.

B-2 a. Sample answers: economic need, smaller families

b. Sample answers: higher divorce rate, economic need

c. and d. Sample answers: poor career preparation because they assumed they would not have to work, discrimination and limiting socialization, lack of awareness of reality

B-2 Give at least two reasons for each of the following facts:

a. More women are working today than ever before.

b. Forty-two percent of working women are single or are the head of a household.

c. Thirty-four percent of families with females as the head of the household have incomes below the poverty level.

d. Women receive the largest percent of public aid and welfare payments.



Activity C: Flight check

Did you understand this lesson? To find out, answer the following question without looking back at the lesson. Then, your teacher will help you check your answers.

Assume that you are going to live 100 years. Make a circle graph that shows how you plan to spend your time.

TEACHER OVERVIEW FOR LESSON 14

Duration: Two or more class periods

Purpose: To help students think about decisions that concern their own educational plans

Student Objective:

- To construct a frequency table, a histogram, and a line graph based on students' personal plans for higher education

Teaching Suggestions:

All levels: Single activity (A)

(This lesson is important, since it provides an opportunity for students to make personal and/or group decisions using the information learned in the unit.)

Vocabulary: No new words

Evaluation Activity: None

Background:

The following is the main point of the lesson. Make sure to emphasize it as often as appropriate.

- If students begin thinking early about their future, they will be better prepared to develop sound, realistic plans.

Lesson 14: Thinking about Your Education

Activity A: What next?

After you graduate from high school, how many more years of schooling do you want to get? Include junior college, vocational-technical school, college, university, or other types of schooling.

A-1 Your teacher will ask everyone in your class the above question. As each person answers, record the answers on a frequency table. To make the table:

- Step 1 Decide on the range of years (top and bottom points).
- Step 2 Decide on the intervals (how much between each point).
- Step 3 Construct the frequency table.

Suggestions for Activity A: The collection of data for this activity may be performed by one recorder appointed for the class or by several recorders interviewing students in different groups. In the latter case, the data from all the recorders would need to be pooled to construct the frequency table.

Once the completed frequency table is available to all students (perhaps on the chalkboard), the exercises at the end of the activity may be performed individually.



Lesson 14

After 15 people have answered, your table might look like this:

Plans for Education after High School				
Years of Education after High School	Tallies		Frequency	
	Girls	Boys	Girls	Boys
8				
7				1
6				
5				
4			5	3
3				
2			1	2
1				
0			2	1

In the tallies column, note how every fifth tally mark crosses the other four marks. This makes it easy to find the totals.

After you complete your frequency table, answer the following questions.

- A-2 What is the mean average number of years of education after high school that the girls in your class want to have?
- A-3 What is the mean average number of years of education after high school that the boys in your class want to have?

- A-4 What is the mean average number of years for the entire class?
- A-5 Construct a histogram of the data you collected.
- A-6 Construct a line graph of the data you collected.
- A-7 What is the median number of years of education after high school for the girls? For the boys? For the class?
- A-8 What is the mode of the number of years of education after high school for the girls? For the boys? For the class?

TEACHER OVERVIEW FOR LESSON 15

Duration: Two or more class periods

Purpose: To give students an opportunity to think about job and salary differences that exist between women and men in the labor force

Student Objectives:

- To identify wage differences between women and men employed in similar jobs
- To suggest desirable changes in jobs and salaries for women and men
- To state personal job preferences and to give reasons for those preferences

Teaching Suggestions:

All levels: All activities

(This lesson is important, since it provides an opportunity to students to make personal and/or group decisions using the information learned in the unit.)

Vocabulary: No new words

Evaluation Activity: None

Special Preparations: Make copies of the job cards and distribute them randomly to the students. It is not necessary that female students get the "woman" jobs and male the students the "man" jobs. If the activity extends over one class period, collect the cards, with the students' names noted on them, and return the cards to the same students when the lesson continues.

If there are more than 24 students in the class, hand out the necessary number of duplicates.

Background:

The following are the main points of the lesson. Make sure to emphasize them as often as appropriate.

- In most job categories, women are paid less than men are.
- Women are concentrated in a few, relatively low-paying occupations.

Lesson 15: **What's Your Line?**

Activity A: **It's your first job!**

You have just been hired at your first job. You will be given a card that lists information about your job. Form groups with others who have your job type. Some groups will be larger than others.

Group A: Clerical workers

Group B: Professional and technical workers

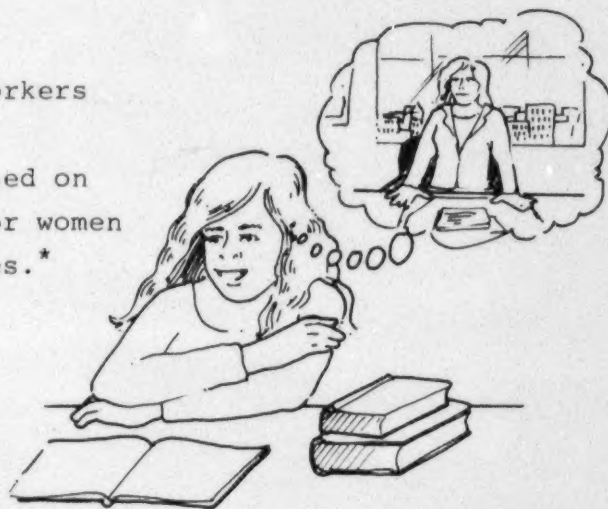
Group C: Managers

Group D: Service workers

Group E: Sales workers

Group F: Craft and kindred workers

The information on your card is based on actual jobs and average salaries for women and men workers in the United States.*



*The information on the job cards is adapted from the *Occupational Outlook Handbook 82-83* and *Occupational Earnings of Men and Women*, April 1982, published by the U.S. Department of Labor.

Lesson 15

In your group, discuss the following questions. Choose a group recorder to write the group's answers.

A-1 through A-4 Variety of answers

A-5 Men get higher salaries in all the job types.

A-6 Variety of answers

A-7 For all groups, nine jobs require math or math-related courses, including elementary school teacher, city manager, agricultural engineer, bank teller, retail sales worker, construction inspector, insurance agent, chef, food-counter worker.

- A-1 a. How many people are in your job type?
b. How many men are in your job type?
c. How many women are in your job type?

A-2 If you do not have the same number of women as men, why do you think this happened?

A-3 Do you think there should be about the same number of men as women in your job type? Why or why not?

A-4 Do you think men and women can do all the jobs in your group equally well? Why or why not?

A-5 Who gets higher salaries in your job type: men or women?

A-6 a. In your group, are there two people who have similar jobs, job descriptions and requirements, but have different salaries?

b. Who has the higher salary: the man or the woman?

c. Do you think this is fair? Why or why not?

A-7 How many jobs in your group require some math or math-related courses (such as accounting and finance)?

Activity B (discussion): Comparing females and males in jobs

B-1 Discuss your answers for Activity A.

B-2 In the clerical workers' group, the administrative assistant (man) and secretary (woman) have similar job descriptions but have different salaries. What is the difference in their salaries?

B-3 In the professional and technical workers' group, the man chemist and woman chemist have the same job title, description, and requirements. But one of them gets a higher salary. What is the difference in their salaries?

B-4 In the managers' group, the man and woman sales managers of retail stores have the same job title, description, and requirements. What is the difference in their salaries?

B-5 In the sales workers' group, the man and woman retail sales workers have the same job title, description, and requirements. What is the difference in their salaries?

B-6 Some job groups have more men than women working in them. For example, traditionally female jobs include teaching, nursing, and secretarial work. Traditionally male jobs include most other types of work.

If your group had more women than men, write the salaries of your group on one side of the chalkboard.

If your group had more men than women, write the salaries of your group on the other side of the chalkboard.

- a. Which job groups get better salaries: the ones with more men or more women?
- b. Why do you think they get different salaries?

B-2 \$211.

B-3 \$6,130.

B-4 \$5,990.

B-5 \$3,900.

B-6 a. You may need to help students answer this question.

The groups with more men are: Professional and Technical, Managers, Sales Workers, and Craft and Kindred. The groups with more women are: Clerical Workers and Service Workers. The jobs with more men are generally better paying than those with more women.

b. Sample answers: women tend to cluster in low-paying jobs; women tend to get less education and tend to avoid courses that lead to well-paying jobs; men can work more years without interruption for family duties, thus accumulating more experience and receiving more pay; women have discontinuous work patterns due to family care responsibility and have difficulty finding the type of jobs they want after an absence; women have often been discriminated against in terms of hiring and salaries.

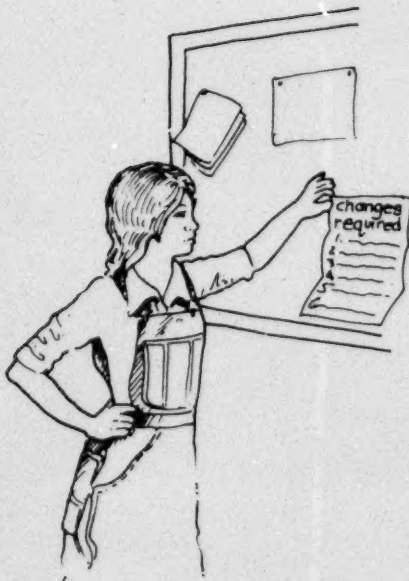
Briefly explain these facts to the students, perhaps after the class discussion. Mention the fact that the labor market is changing with regard to equality for women, but more changes are needed for women and minorities in order to reach equality.

Activity C:
What jobs interest you?

- C-1 Did you like the job you got on your card? Why or why not?
- C-2 If you did not like the job on your card:
- a. What kind of job would you like?
(It can be any job, not only the ones on the cards.)
 - b. Find out the job requirements for the kind of job you want and list them.
 - c. How can you prepare for this job?

You might change your mind later about the job you want—many people do. It's good to watch for other jobs you might like.

Activity D:
Making changes



What changes would you like to see take place in the jobs and salaries held by men and women? What can you do to help change things? What can others do?

In the past few years, some women have begun to get jobs that used to be held mainly by men. Some men have begun to get jobs that used to be held mainly by women. Also, men and women in the same jobs are beginning to receive similar salaries. It is possible to change things!

Form a group with three or four other students. Choose a group recorder to write your group's answers to D-1 and D-2.

D-1 Make a chart listing the changes you would like to see in jobs and salaries for women and men.

D-2 For each change, discuss ways you and others can help make those changes.

D-3 Present your plan for change to the class.

D-1 Sample answers: equal opportunity, equal pay, reasonably equal distribution among occupational groups

D-2 Sample answers: continued legal change; better career planning; movement by women into non-traditional jobs; socialization that is not based on sex stereotypes; encouragement by counselors, teachers, and parents for girls to rethink their definitions of themselves; use of political participation skills such as organizing, supporting, mobilizing, cost-benefit analysis, and voting to gain equal treatment of women and men

Note: Participation skills are covered in the unit Decisions and You.

Man Job Type: Professional and Technical Job: Chemist Description: Do basic research in chemistry Requirements: College degree in chemistry Salary: \$25,584	Woman Job Type: Professional and Technical Job: Elementary school teacher Description: Teach elementary school children basic math, language, science, and social studies Requirements: College degree in education; teacher certification Salary: \$16,172
Man Job Type: Sales Manager Job: Manager, retail store Description: Supervise other workers, advertising, buying and selling, customer relations Requirements: Four years college helpful but not necessary Salary: \$15,760	Woman Job Type: Professional and Technical Job: Chemist Description: Do basic research in chemistry Requirements: College degree in chemistry Salary: \$19,454
Man Job Type: Manager Job: City manager Description: Manage daily activities of a city, such as garbage removal, growth, transportation Requirements: Five years of college or Master's degree, including one year of college math Salary: \$33,000	Woman Job Type: Sales Manager Job: Manager, retail store Description: Supervise other workers; advertising, buying and selling, customer relations Requirements: Four years college helpful but not necessary Salary: \$9,770

Man Job Type: Clerical Worker Job: Administrative assistant Description: Be responsible for routine duties at an office Requirements: High school diploma; secretarial training Salary: \$12,116	Woman Job Type: Clerical Worker Job: Secretary Description: Type, take shorthand, and be responsible for routine duties at an office Requirements: High school diploma; secretarial training, including typing and shorthand Salary: \$11,905
Man Job Type: Professional and Technical Worker Job: College professor Description: Teach college courses in a particular subject Requirements: Doctoral degree; teaching experience; published articles and books Salary: \$25,200	Woman Job Type: Clerical Worker Job: File clerk Description: Label, store, update, and collect information in files Requirements: High school diploma; typing and good knowledge of English Salary: \$9,828
Man Job Type: Professional and Technical Worker Job: Agricultural engineer Description: Design machinery and equipment, and improve ways to grow food Requirements: Master's degree in engineering (including math courses) Salary: \$22,900	Woman Job Type: Clerical Worker Job: Bank teller Description: Handle deposits and withdrawals from accounts Requirements: High school diploma; clerical skills; some math Salary: \$9,776

Lesson 15

Man		Woman	
Job Type: Craft and Kindred		Job Type: Service Worker	
Job: Jeweler	Description: Design jewelry, do stone setting and engraving	Job: Household worker	Description: Clean house, cook meals, help care for children
Requirements: High school diploma; four years apprenticeship	Salary: \$13,000	Requirements: Experience and ability to cook and clean; courses in home economics helpful	Salary: \$5,408
Man		Woman	
Job Type: Craft and Kindred		Job Type: Sales Worker	
Job: Maintenance electrician	Description: Keep lights, generators, and other electrical equipment in good working order	Job: Retail sales worker	Description: Sell products, write receipts, receive payment and make change
Requirements: Four years apprenticeship	Salary: \$16,640	Requirements: High school diploma; courses in merchandising, accounting, math	Salary: \$8,008
Man		Woman	
Job Type: Craft and Kindred		Job Type: Craft and Kindred	
Job: Construction inspector	Description: Inspect building construction, electrical and mechanical works, or public works	Job: Sewing machine operator	Description: Sew clothes by machine in a garment factory
Requirements: Two years of junior college with some courses in math	Salary: \$16,300	Requirements: Courses in sewing; high school diploma unnecessary	Salary: \$8,112

Lesson 15

Man		Woman	
Job Type: Service Worker		Job Type: Service Worker	
Job: Chef	Description: Prepare meals and supervise kitchen staff	Job: Food- counter worker	Description: Serve customers in cafeterias and fast-food restaurants
Requirements: Courses in business math and food preparation; experience as a cook	Salary: \$16,640	Requirements: High school diploma unnecessary but must be good in math	Salary: \$8,632
Man		Woman	
Job Type: Sales Worker		Job Type: Service Worker	
Job: Retail sales worker	Description: Sell products, write receipts, receive payments, and make change	Job: Social service aide	Description: Help social workers and people who need aid from social agencies
Requirements: High school diploma; courses in merchandising, accounting, math	Salary: \$11,908	Requirements: Two years of junior college	Salary: \$8,944
Man		Woman	
Job Type: Sales Worker		Job Type: Service Worker	
Job: Insurance agent	Description: Sell insurance policies and help customers plan the use of their money	Job: Licensed practical nurse	Description: Help registered nurses and doctors care for patients
Requirements: College degree preferred, with courses in accounting, finance, insurance, and math	Salary: \$20,904 (could be higher, depending on policies sold)	Requirements: Training as a practical nurse; high school diploma preferred	Salary: \$12,500

Your Future

Part III

TEACHER OVERVIEW FOR LESSON 16

Duration: Two or more class periods

Purpose: To give students an opportunity to think about the importance of making realistic plans for the future

Student Objective:

- To state problems that may develop as a result of not planning for one's economic future

Teaching Suggestions:

All levels: All activities

(This lesson is important, since it provides an opportunity for students to make personal and/or group decisions using the information learned in the unit.)

Vocabulary: No new words

Evaluation Activity: None

Background:

The following is the main point of the lesson. Make sure to emphasize it as often as appropriate.

- Many women (and men) become trapped in undesirable economic situations as a result of not planning for their economic future.

Lesson 16: **Deciding to Plan**

Activity A (discussion): Thinking about economic problems

Our culture is changing in many ways. Some of these changes have caused problems for women and minority groups. Here are some examples of problems:

- The fastest-growing poverty group today is women. Two out of three Americans whose income is below the poverty level are women.
- Women rarely get retirement payments. Only one in twenty retired women gets a retirement payment.
- Women make 60 cents in salary for every dollar a man makes. Eighty percent of all working women are in the lowest-paying jobs.
- Nine out of ten women will have to work sometime during their lives.
- Less than 15 percent of all families in America still have a husband who works and a wife who stays home with the children.

Lesson 16

- A-1 Obtaining a good education, choosing a non-traditional field, evaluating and comparing job benefits, aiming for administrative and managerial positions
- A-2 To prepare oneself for the work market with advanced education and skills; to recognize that marriage is no guarantee of economic security and that you may need to/want to enter the work force at some point in your life even if you marry.

A-1 If you are a girl, how can you keep the first three problems from becoming true about yourself?

A-2 Why is it important to know about the last two problems?

Activity B: **How did they end up this way?**

Read the following story by yourself or with your class.

A Change in Plans

Sonia is 21 years old. After looking for a job for six months, she finally found one last month. She is a clerk typist in an office.

Sonia is asking herself a question: How did I end up working here? She certainly had not planned it this way. Her teenage dreams had included a husband, a baby, and a nice house. She had not thought she would have to work.

In middle school, Sonia had been a very good student. She liked math and science and planned to go to college. She thought that perhaps she would become an engineer or a laboratory technician. She was fascinated by what she had heard about both careers.

Her dreams changed in high school, when she met Tim. Tim had dreams of the future, too. He wanted to be a professional basketball player. Tim and Sonia began dating. Sonia's dreams about becoming an engineer faded. She began to think of life with Tim. She didn't take as much math and science in high school as she had planned.

As they neared graduation, Sonia and Tim decided to get married right away. Sonia would not go to college. Instead, she would stay home and take care of the housework while Tim got a job.

Tim still wanted to be a basketball player. However, he found that the competition—even for a good player like him—was very great. No professional team wanted him straight out of high school, and he wasn't interested in college. The only job he could find was working in a warehouse.

At first, they had been happy, even though they did not have much money. A few months later, Sonia became pregnant and Tim lost his job. The strain of not having money and of planning for a baby at the same time was too much. Tim and Sonia began arguing with each other. Soon they were divorced.

Even after the divorce, Sonia was not frightened about the future. She knew that Tim had found another job. He would give her money to care for the baby. But that did not turn out quite as planned, either. Sonia could not manage on the money Tim was sending her. Before she knew it, she was on welfare. Her income was below poverty level!

Sonia decided she had to get a job. But she had not prepared to work. She had no skills except typing. That's how she ended up in the clerk typist job.



Sonia has now worked at the office for a month. She dislikes her job. It is boring, and she feels that she deserves a much better job. She has decided to go to night school to increase her skills.

Tim is also disappointed in his job. But he has not been able to find anything better. The higher-paying jobs require special skills from a vocational-technical school or a college.

Both Sonia and Tim wish they had waited until later to get married. And they wish they had planned their careers more realistically. If they had, they would probably not be in such a mess now.

- B-1 Pretend you have suddenly become the head of a family and your income is below poverty level.
- a. How do you feel?
 - b. How did you get into this situation? (Use your imagination.)
 - c. List some things that happened that you could not control.
 - d. List some decisions you made that led you into this situation.
 - e. What could you have done differently to avoid this situation?
- B-2 Make a circle graph showing your life plan. Show what activities you will do and for how long. As you make the graph, think carefully about your future. What you think now will affect what you become.

Activity C:

Class wrap-up

Discuss your answers for Activity B.

TEACHER OVERVIEW FOR LESSON 17

Duration: Two or more class periods

Purpose: To give students an opportunity to think about realistic career decisions

Student Objective:

- To write a career plan, including advantages and disadvantages, values, and reasons for the choice of career

Teaching Suggestions:

All levels: All activities

(This lesson is important, since it provides an opportunity for students to make personal and/or group decisions using the information learned in the unit.)

Vocabulary: No new words

Evaluation Activity: None

Background:

The following is the main point of the lesson. Make sure to emphasize it as often as appropriate.

- If people set realistic goals in advance, they will be more likely to realize those goals and to lead a productive life.

Two excellent sources for additional information about jobs are The Occupational Outlook Handbook and Exploring Careers, both prepared by the U.S. Department of Labor, Bureau of Labor Statistics. The latest edition of The Occupational Outlook Handbook is 1982-83; Exploring Careers is available in a 1979 edition, at this writing.

Lesson 17: **A Realistic Plan**

Activity A: **Planning a career**

Believe it or not, someday soon you will be an adult. If you plan your future carefully, you can have an interesting, full life.

"What kind of planning?" you may ask. Well, how much money do you want to make? Where do you want to live? Do you want to know many people? What kind of people? Do you want to live in the woods, on a farm, or in the city? What kind of car do you want--a big, comfortable gas guzzler or a small economy car? Do you want to marry? If so, when? Do you want to marry early, or do you want a good education first? What kind of job do you want?

Chances are that you don't know what career you want, or how much money you want to make. But you have to start thinking about your life. You'll be much happier if you plan for it now. No excuses! If you work toward your goals, you can reach them.

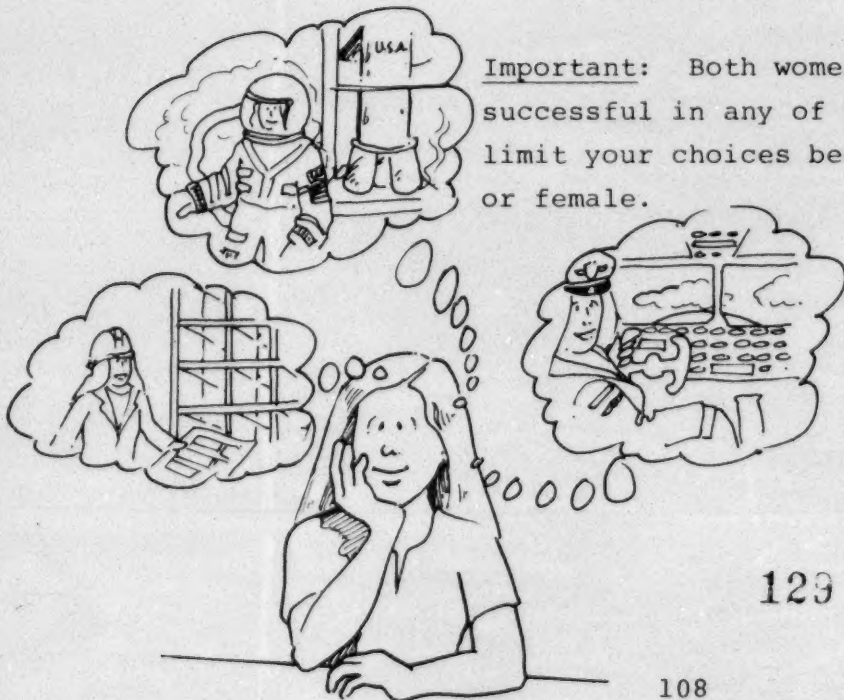


In this lesson, you will have the opportunity to think about who you are and what you want to become. As you do the activities, remember the following things:

- Your plan for the future must be realistic. For example, it is realistic to plan to be an accountant in the 1980s and 1990s. There will be many accounting jobs open in these years.
- Your plan must be good for you. The job you plan for should provide the amount of money you need or want. It should also be enjoyable.

To help you think about some careers, read the next section. It provides some information about various jobs that will be available in the 1980s and 1990s.

Important: Both women and men can be successful in any of these jobs. Don't limit your choices because you are a male or female.



Career Information*

Accountants

They keep the financial records of a business. They are needed because managers depend more and more on dollars-and-cents information.

Educational background: Degree in accounting

Starting salary: \$15,100

After several years: \$18,400 to \$31,900

Chief accountant: \$28,300 to \$50,000

Administrative Support Occupations,
including Clerical

Examples include airline reservation clerks, bank tellers, office, stock, and postal clerks, secretaries, receptionists, bookkeepers, credit representatives, claims adjusters, teacher's aides, telephone operators, mail carriers, and typists.

Educational background: High school diploma usually required. For most jobs, some math. Other requirements depend on specific job duties. On-the-job training may be provided.

Starting salary: \$9,000 to \$18,000

After several years: \$11,500 to \$21,500



*Source: U.S. Department of Labor, Bureau of Labor Statistics; *Occupational Outlook Handbook* 82-83. U.S. Department of Labor, Bureau of Labor Statistics.

Advertising workers

They do writing, research, and sales work. There are many jobs in large cities such as Los Angeles, New York City, and Chicago.

Educational background: Degree in English, advertising, or journalism

Starting salary: \$10,000 to \$18,000

After several years: \$18,000 to \$25,000

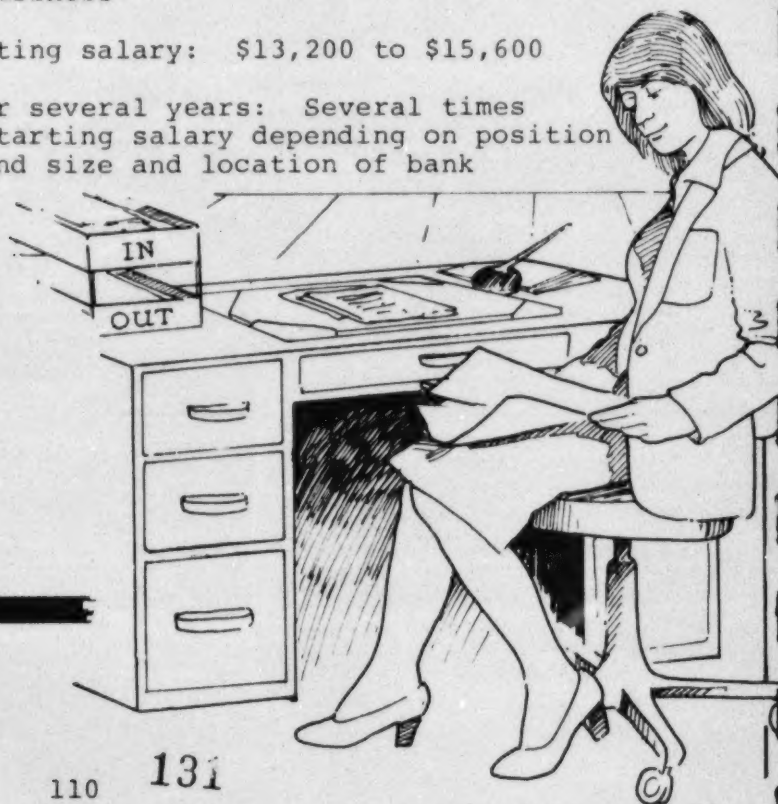
Bank officers and managers

They supervise workers in banks, give advice to individuals and businesses, and take part in community projects.

Educational background: Degree in business

Starting salary: \$13,200 to \$15,600

After several years: Several times starting salary depending on position and size and location of bank



Computer programmers

They write programs for computers.

Many jobs are available in this area.

Educational background: Degree in
computer programming

Starting salary: \$13,000 to \$15,600

After several years: \$24,440 to \$26,000

Engineers

Some engineers work in manufacturing companies that produce electronic equipment. Other engineers work in construction or public utilities. Others work as professors or researchers. Also, engineers design factories and work on environmental problems.

Educational background: Degree in
engineering

Starting salary: \$22,900

After several years: \$32,516

Market research workers

They study information about products and the people who buy them. They also interview people to get information that will help companies make decisions about buying and selling.

Educational background: Degree in business, marketing

Starting salary: \$12,000 to \$17,000

After several years: \$27,000

Occupational therapists

They help handicapped adults and children in schools, hospitals, clinics, and camps.

Educational background: Degree in occupational therapy

Starting salary: \$16,700

After several years: \$19,000 to \$23,000

Personnel workers

They are responsible for finding good people to work in a company.

Educational background: Degree in business

Starting salary: \$16,100

After several years: \$21,000 to \$31,600

Directors: \$27,719 to \$49,730

Police officers

Responsibilities range from controlling traffic to preventing and investigating crimes.

Educational background: High school diploma usually required. Civil service requirements (usually). Some college training may be necessary.

Starting salary: \$13,000 to \$16,500

After several years: \$19,100 to \$20,500

Public relations workers

They keep the public informed about the company.

Educational background: Degree in business, writing, or public relations

Starting salary: \$10,000 to \$13,000

After several years: \$29,000





Purchasing agents

They buy services and supplies for the company.

Educational background: Degree in business administration or purchasing

Starting salary: \$16,200

After several years: \$20,300

Service workers

Examples of these are workers in cleaning service, food service (including chefs and cooks), health service, child care workers, hairdressers and barbers.

Educational background: On-the-job training or one or two years of training in a vocational school or community college

Starting salary: \$5,255 to \$16,494

After several years: \$8,600 to \$18,500

Urban and regional planners

They plan urban and rural community growth.

Educational background: Graduate work (2 years) in urban/regional planning

Starting salary: \$13,800

After several years: \$24,000

Now write a realistic career plan. Use the questions below as a guide. You may choose one of the careers described in this lesson or think of another one.

- A-1 What do you consider to be your strong points (in personality and skills)?
- A-2 What activities do you enjoy the most?
- A-3 What are your values?
- A-4 Do you like to make decisions?
- A-5 What two or three occupations interest you?
- A-6 Write an advantage and disadvantage of each occupation. Think of what the job offers in terms of money, travel opportunities, chances to meet people, responsibility, and so on.
- A-7 Which occupation interests you the most? Why?
- A-8 How can you achieve this career?
 - a. What skills or abilities do you need?
 - b. How will you obtain these skills?
 - c. What other actions must you take to achieve this career? (Think about high school courses, marriage plans, money, and so on.)
- A-9 What will you gain if you choose this career?
- A-10 What will you give up if you choose this career?
- A-11 What people (now or in the future) might encourage you to prepare for this career?
- A-12 What people (now or in the future) might discourage you?

Activity B:
Writing a personal career plan

Using the answers to A-1 through A-12, write a short career plan. Include:

- The career you want
- Why you want it
- How you plan to achieve it

Read your plan to the class.

TEACHER OVERVIEW FOR LESSON 18

Duration: One class period

Purpose: To encourage students to have a positive attitude toward learning math

Student Objectives:

- To state attitudes toward math and related career aspirations
- To identify factors that improve competence in math

Teaching Suggestions:

All levels: All activities

(This lesson is important, since it provides an opportunity for students to make personal and/or group decisions using the information learned in the unit.)

Vocabulary: No new words

Evaluation Activity: None

Background:

The following is the main point of the lesson. Make sure to emphasize it as often as appropriate.

- High motivation, a positive attitude, and participation in math courses and related activities are major factors that contribute to a person's success in math.

Lesson 18: **Changing Your Feelings about Math**

Activity A: Learning to like math

Here are some reasons one student said she was afraid of math.

- Because it is like a foreign language
- Because I feel stupid in math class
- Because I'm not good at math

Can people who don't like math change their feelings about math?

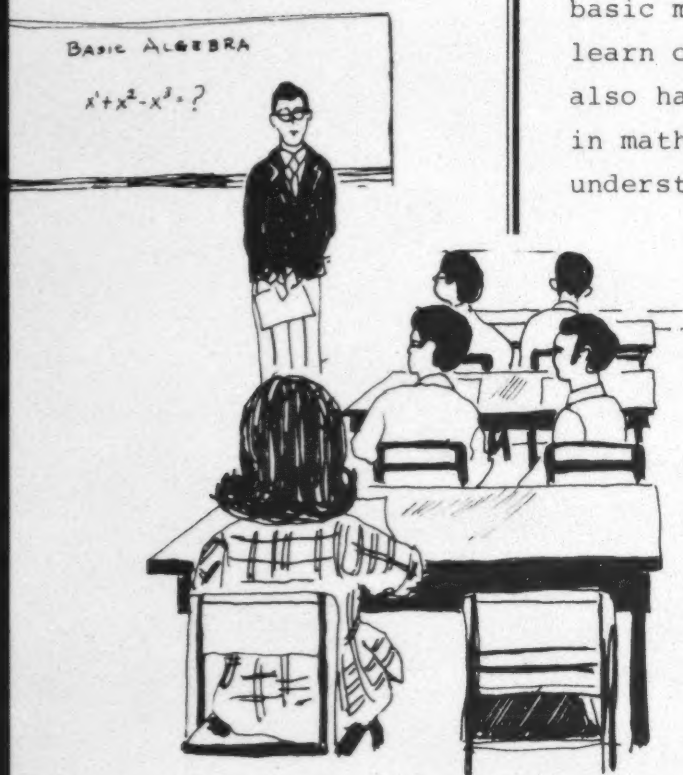
To find out, read the following story.

Clarissa

Clarissa had just begun to see the importance of math. She used it in doing many basic things, such as planning how to spend her allowance. She also realized that the careers in which she was interested required some math.

Clarissa did not enjoy math very much. In fact, she had either day-dreamed through all of her math classes or missed them completely. But now she decided to change all that and learn some math.

Clarissa began by paying close attention in class the next week. But she still couldn't understand what was going on. She was a little frightened but still determined to learn. She wondered where she should begin. Perhaps her aunt Pearl, who was an engineer, could help. Clarissa went to see her. She gave Clarissa some basic math books and showed her how to learn one step at a time. Clarissa also had a friend, Jerry, who was good in math. She asked Jerry to help her understand math.



Slowly Clarissa became more at ease with math. Each time she solved another math problem, she felt a sense of excitement and pride. Some of her classmates began asking Clarissa to explain math to them. Success at math felt so much better than failure. Clarissa promised herself she would continue to learn new things about math.

Now form a group with three or four other students. Discuss the questions below. Choose a group recorder to write your group's answers.

A-1 List suggestions that could help to change a person's negative attitude toward math.

A-2 What facts about the usefulness of math might help someone change her or his attitude toward math?

A-3 What things can parents, teachers, and friends do to help girls feel that math is for females as well as males?

A-1 Sample answers: Seek encouragement from people who enjoy math; strive to improve math skills (a person who is good in math will naturally have a more positive attitude toward math); see relevance to the work world and everyday living; realize that math is not just for males

A-2 Sample answers: Because of growth in technology, math is required in an increasing number of careers; many math-related occupations are high in salary and prestige.

A-3 Sample answers: Parents and teachers can encourage girls to become interested in traditionally male careers that require a math background; friends can accept the idea of girls being good in math rather than feel that girls should take little or no math in high school.

Activity B:
How do you feel?

- B-1 Has this unit made any differences in your feelings about math? If so, how?
- B-2 Have you changed your plans about how much math you are going to take in high school? If so, how?
- B-3 Has this unit made a difference in your thoughts about a career for yourself? If so, how?

Activity C:
Class wrap-up

- C-1 Discuss your answers for Activities A and B.
- C-2 Discuss the careers you chose in Lesson 17. Compare the careers boys chose with the careers girls chose. Do girls feel they have as many choices as boys have? What factors may discourage girls from taking math in high school or preparing for careers in college?

Name _____

DECISIONS ABOUT MATHEMATICS
UNIT PERFORMANCE TEST

Section I: Multiple Choice or Short Answer

Lesson 3

1. Below is some information about how Alice, a 13-year-old girl, spends her time each day. Complete the frequency table. Find the total for each day.

<u>School</u>		<u>House & Family Care</u>		<u>Homework</u>	
Sun:	0 hrs	Sun:	5 hrs	Sun:	2 hrs
Mon:	5 hrs	Mon:	6 hrs	Mon:	3 hrs
Tues:	5 hrs	Tues:	8 hrs	Tues:	1 hr
Wed:	5 hrs	Wed:	4 hrs	Wed:	3 hrs
Thurs:	5 hrs	Thurs:	5 hrs	Thurs:	3 hrs
Fri:	5 hrs	Fri:	5 hrs	Fri:	2 hrs
Sat:	0 hrs	Sat:	7 hrs	Sat:	1 hr

	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Total
House & Family Care								
School								
Homework								
Total								

Directions: Use the information from your frequency table in question 1 to answer questions 2 and 3.

2. How many hours each week does Alice spend in school?
3. On Tuesday, what is the total number of hours Alice spends at school, doing house and family care, and doing her homework?
- _____

Lesson 5

Directions: Below is a list of weekly incomes for women and men. Use these data to answer questions 4 through 6.

<u>Men's Weekly Income</u>	<u>Women's Weekly Income</u>
\$160	\$100
170	105
190	120
200	120
220	140
230	145

4. a. What is the mean of men's income? _____
 b. What is the mean of women's income? _____
 c. Is the mean income higher for men or for women? _____
5. a. What is the mode of men's income? _____
 b. What is the mode of women's income? _____
6. a. What is the median of men's income? _____
 b. What is the median of women's income? _____

Lesson 7

Directions: Answer questions 7, 8, and 9, using the data in this table:

Median Salary for Full-Time Workers in 1973	
White women	= \$ 6,544
Minority women	= 5,772
White men	= 11,633
Minority men	= 8,363

7. What was the median salary for minority women in 1973, rounded to the nearest hundred? _____
8. What was the median salary for white women in 1973, rounded to the nearest ten? _____
9. What was the median salary for white men in 1973, rounded to the nearest thousand? _____

Lesson 8

10. Read the following problem and put an X by the correct answer.

$$X = (***)$$

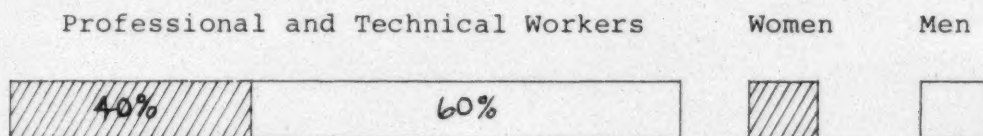
$$Y = (0000)$$

The ratio of X to Y is:

- ☐ a. 3:7
- ☐ b. 4:3
- ☐ c. 3:4
- ☐ d. 7:3
- ☐ e. None of the above

11. 25% of 20 = _____

12. The figure below shows the percent of women and the percent of men who are professional and technical workers (examples: teachers, professors, doctors). What is the ratio of women to men among professional and technical workers?



Lesson 9

13. Here are some data on the number of women who were lawyers and judges during selected years. Using the data, complete the pictograph in the space given below.

Data	Number of Female Lawyers and Judges
1950	10,000
1970	15,000
1976	40,000

Key:  = 5,000 females

Year	Number of Female Lawyers and Judges

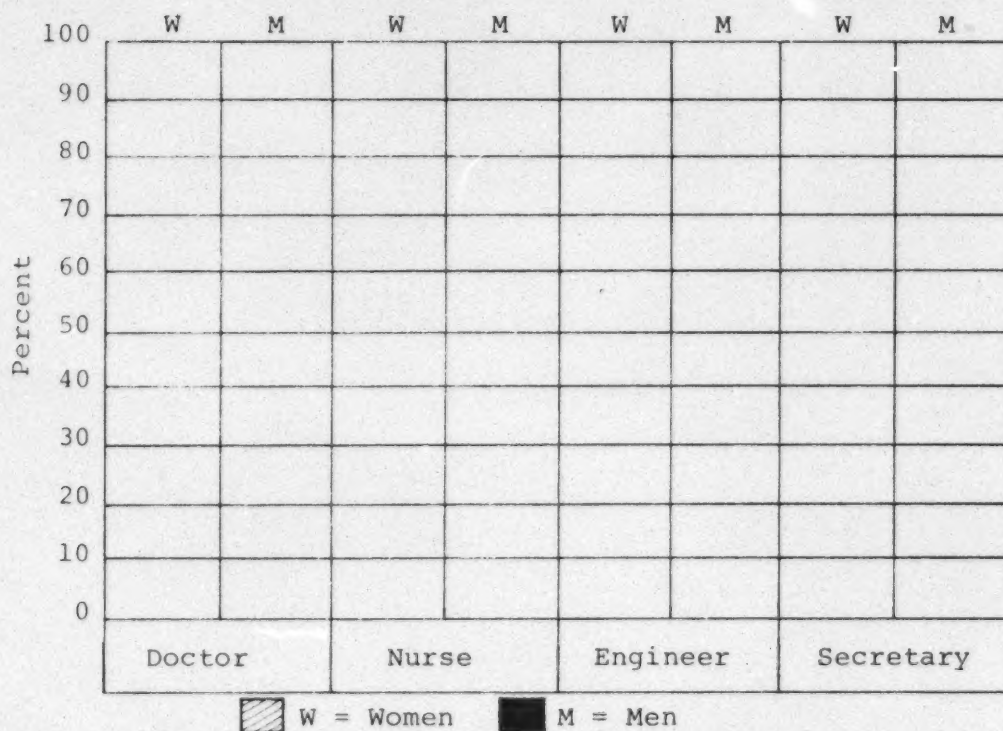
Lesson 10

14. Complete the histogram below, using the following data:

Percent of Women and Men
in Selected Jobs

	Women	Men
Doctor	13%	87%
Nurse	97%	3%
Engineer	2%	98%
Secretary	98%	2%

Percent of Women and Men in Selected Jobs



15. According to the histogram, in which job is the percentage of women the lowest?
- Doctor
 - Nurse
 - Engineer
 - Secretary
16. According to the histogram, in which job is the percentage of men the lowest?
- Doctor
 - Nurse
 - Engineer
 - Secretary

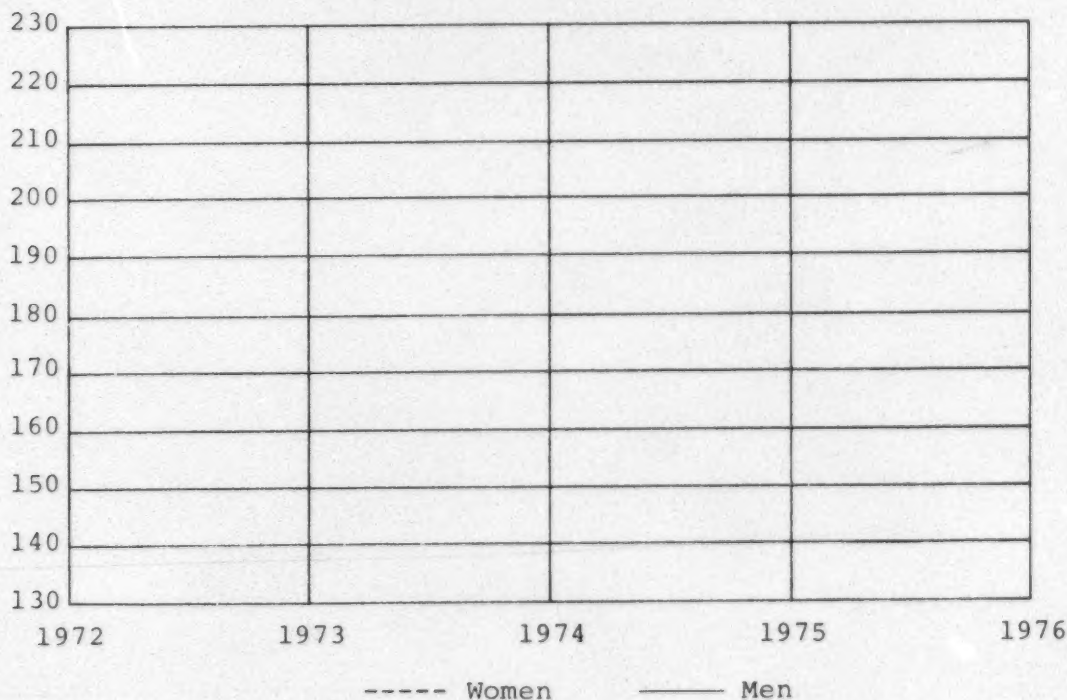
Lesson 12

17. Draw a line graph that shows two sets of data—one for men and one for women—in the space given below. Use the following data.

Degrees below the Bachelor's Degree Awarded to Men and Women		
<u>Year</u>	<u>Men</u>	<u>Women</u>
1972	180,000	130,000
1973	190,000	150,000
1974	200,000	170,000
1975	210,000	180,000
1976	230,000	200,000

The numbers are rounded to the nearest ten thousand. Use a solid line for the data on men (——) and a broken line (-----) for the data on women.

Degrees below the Bachelor's Degree
Awarded to Men and Women



18. According to your line graph, is this statement true or false:

The number of women receiving degrees increased each year from 1972 to 1976.

True _____ False _____

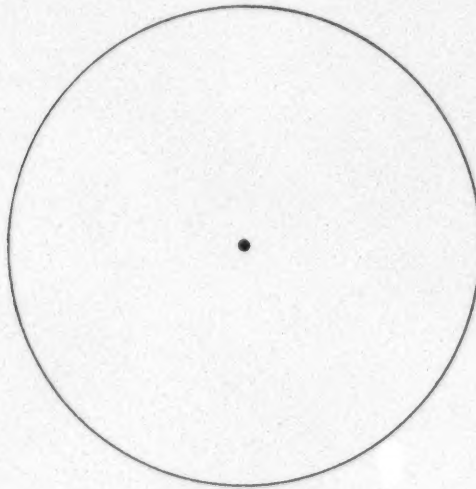
Lesson 13

19. In 1973, the distribution of women workers in different job types was as follows:

61% white-collar workers
16% blue-collar workers
22% service workers
1% farm workers

Use these data to make a circle graph, in the circle below. Label each section according to whether it represents white-collar workers, blue-collar workers, service workers, or farm workers.

Distribution of Women Workers by Job Type, 1973



- ____ 20. According to the circle graph, the majority of women workers are in which job type?
- a. White collar
 - b. Blue collar
 - c. Service
 - d. Farm

Section II: Attitude Inventory

Directions: Show how much you agree or disagree with each statement by writing a letter next to it, using the following code. There are no right or wrong answers.

a = strongly agree
b = agree
c = not sure
d = disagree
e = strongly disagree

- _____ 1. Studying mathematics is just as appropriate for women as for men.
- _____ 2. Girls can do just as well as boys in mathematics.
- _____ 3. It's hard to believe a female could be a genius in mathematics.
- _____ 4. Girls who enjoy studying math are a bit odd.
- _____ 5. I am sure that I can learn mathematics.
- _____ 6. I think I could handle more difficult mathematics.
- _____ 7. I have a lot of self-confidence when it comes to math.
- _____ 8. I'm not good at math.
- _____ 9. I'm not the type to do well in math.
- _____ 10. For some reason, even though I study, math seems very hard for me.
- _____ 11. I'll need mathematics for my future work.
- _____ 12. Knowing mathematics will help me earn a living.
- _____ 13. I will use mathematics in many ways when I am an adult.
- _____ 14. Mathematics will not be important to me in my life's work.
- _____ 15. Taking mathematics is a waste of time.
- _____ 16. I expect to have little use for mathematics when I get out of school.

DECISIONS ABOUT MATHEMATICS
ANSWER KEY TO UNIT PERFORMANCE TEST

Section I

Lesson 3

1.

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Total
House & Family Care	5	6	8	4	5	5	7	40
School	0	5	5	5	5	5	0	25
Homework	2	3	1	3	3	2	1	15
Total	7	14	14	12	13	12	8	80

2. 25 hours

3. 14 hours

Lesson 5

4 a. \$195

b. \$121.67

c. Men

5 a. None

b. \$120

6 a. \$195

b. \$120

Lesson 7

7. \$5,800

8. \$6,540

9. \$12,000

Lesson 8

10. c

11. 5

12. 2 to 3 (or 4 to 6, or 40 to 60; may also be expressed as a fraction)

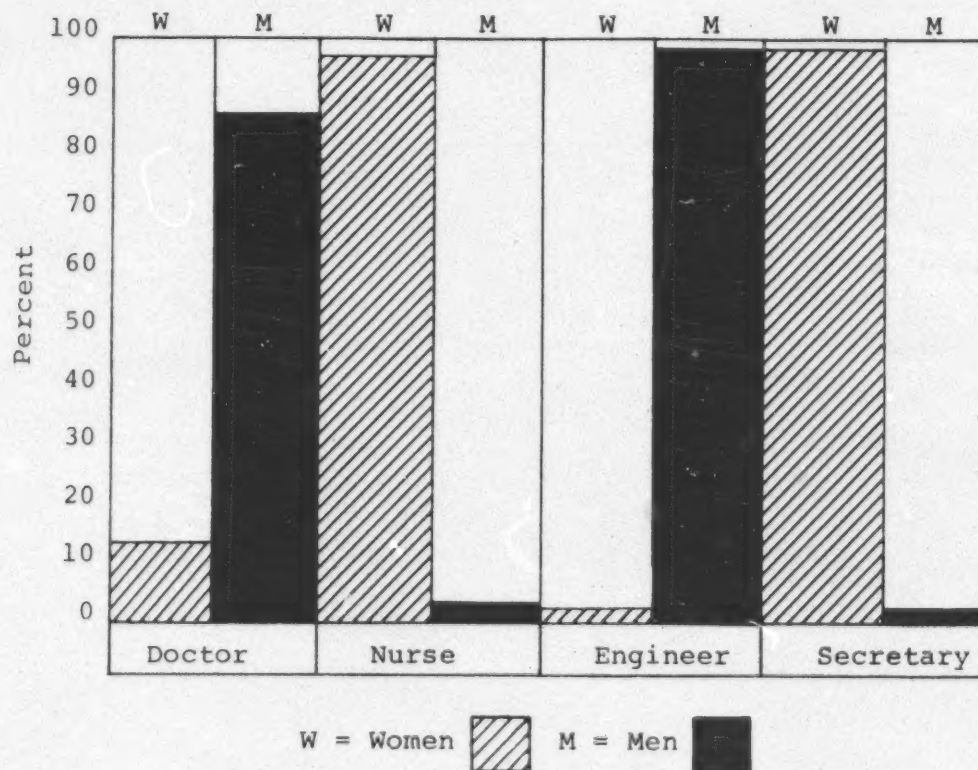
Lesson 9

13. Key:  = 5,000 females

Year	Number of Female Lawyers and Judges
1950	 
1970	  
1976	       

Lesson 10

14. Percent of Women and Men in Selected Jobs

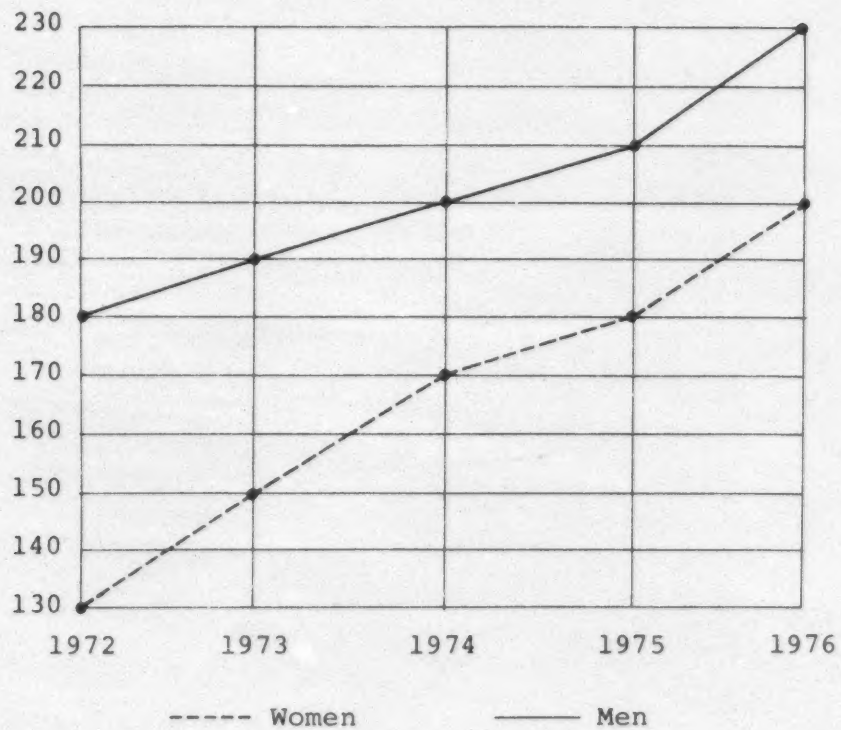


- 15. Engineer
- 16. Secretary

Lesson 12

17.

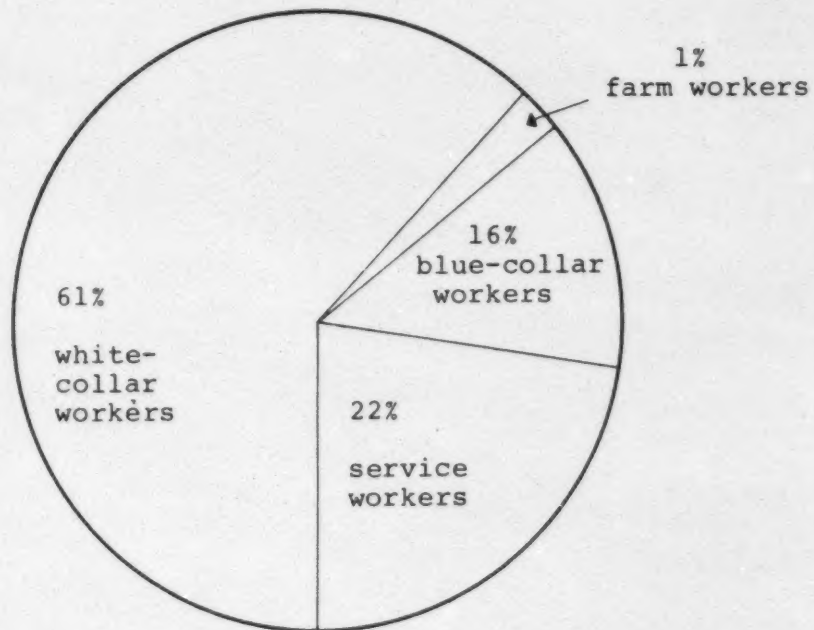
Degrees below the Bachelor's Degree
Awarded to Men and Women



18. True

Lesson 13

19. Distribution of Women Workers by Job Type, 1973



20. White collar

Section II: Attitude Inventory

To obtain an attitude score, use the following system:

For items 1, 2, 5, 6, 7, 11, 12, and 13:

a = 4 points

b = 3 points

c = 2 points

d = 1 point

e = 0 points

For items 3, 4, 8, 9, 10, 14, 15, and 16:

a = 0 points

b = 1 point

c = 2 points

d = 3 points

e = 4 points